The Journal of Obstetrics and Gynæcology of the British Empire

VOL. I. APRIL, 1902. NO. 4.

SUPPRESSION OF URINE FOLLOWING LABOUR.*

BY R. G. McKERRON, M.A., M.D.,

Physician to the Maternity Hospital, Assistant to the Professor of Midwifery in the University, Aberdeen.

THE changes produced by pregnancy in the kidneys and in the urinary secretion have been, and promise for some time to be, the subject of much discussion. Serious disturbances in the renal function have long been recognised as among the most dangerous complications of gestation, but the physiological merges so insensibly into the pathological that it is far from easy, often impossible, to determine the exact point at which the normal is transgressed and danger begins. It is to the urine we must look for an indication. An early and constant sign of morbid changes in the kidney is to be found in a lessened secretion of urine with albuminuria and a lessened elimination of urea. In the most serious form, more especially in that which results in eclampsia, this diminution is very marked, as shown in the interesting series of cases reported by Herman.†

When these pathological changes are the result solely of the pregnant condition they usually disappear rapidly on its termination, though in eclamptic cases death may ensue before the functional activity of the kidneys has been restored.

Though a marked diminution in the quantity of the urine as the result of the nephritis of pregnancy is not uncommon, complete suppression is rare, and I know of no instance in which it has been noted during gestation apart from eclampsia or surgical interference.

* Read before the Obstetrical Society of London, March 5, 1902.

† *Obstet. Trans.*, vols. xxix., xxxii.

Bland Sutton* records a case in which anuria followed ovariotomy in the ninth month of gestation, necessitating the induction of labour. Although such an untoward result is by no means an infrequent experience of the surgeon in renal and other cases, as an obstetric complication it is extremely rare. So uncommon, indeed, is suppression of urine after labour, apart from eclampsia, that no text-book even mentions it, while, so far as I can gather, literature furnishes only three instances of its occurrence.

Recent experience, however, has led me to the conclusion that total or partial suppression of urine is not so uncommon a puerperal complication as these scanty records would suggest. At any rate, in the last three years three cases have come within my own knowledge, two of complete, one of partial suppression. Altogether we have a series of six cases, in five of which the suppression was complete. Notwithstanding the dangerous nature of the condition, it is a remarkable circumstance that in one only of the cases in which symptoms of serious disturbance existed before and during labour does the gravity of the complication seem to have been immediately recognised, with the result that valuable time was lost in initiating active measures of treatment. As will be seen, there was nothing during pregnancy or labour to arouse suspicion, and the medical man, unaware that an entire suspension of the renal function may follow an apparently normal and easy labour, was lulled into a false security by the absence of urgent symptoms, which is so characteristic a feature in many cases of suppression of urine. This important fact is of itself sufficient to justify the present paper.

The causation of suppression of urine after a physiological process, which is normally accompanied by an increased activity of the secretory organs, though in the meantime obscure, is a subject of great interest, and, owing to its dangerous character, of great practical importance. The question, however, is too complex to be settled by so small a number of cases, more especially as we have to rely on purely clinical evidence. Further, from the fact that few symptoms were present during pregnancy, the records are necessarily incomplete.

I shall first give the details of the three cases which came within my own knowledge, and thereafter, to complete the evidence, shall add an abstract of the three published cases.

Case 1.—*Suppression of urine following premature delivery of a still-born fœtus in the eighth month—No symptoms during pregnancy—Duration of suppression one week—Recovery.*

Early in April, 1897, I was consulted by Mrs. S., who wished to engage me for her confinement. She was in the eighth month of her first

* *Lancet*, 1895, i. 461.

pregnancy. She was twenty-three years of age, high coloured, but of a delicate and strumous appearance, and markedly neurotic.

A week or two before coming to me she began to observe swelling of her ankles and puffiness of the face and hands. This increased, and when seen by me the œdema was quite obvious but not excessive in amount, and was limited to the situations mentioned above. Her urine was found to be scanty in amount and almost solid with albumen. She was ordered rest in bed, and put on an exclusively milk diet. This led to an improvement in the condition of the urine, which increased in quantity and contained less albumen; but, notwithstanding, in a few days labour pains set in, and she was delivered after an easy labour of a seventh-month fœtus, which had evidently been dead for over a week. She made a good though somewhat slow recovery. The albumen rapidly diminished in amount, but did not finally disappear till three weeks after labour.

In the beginning of September, 1898, she again became pregnant. In the interval the urine was examined on two or three occasions, and found free from albumen. In the early months of pregnancy she was remarkably well. There was no sickness nor was there any œdema. The urine was tested at intervals of about a month, but showed no albumen.

On the forenoon of April 17 I received a message to call on her. At 3 a.m. she had been seized with a sudden pain in the lower part of the abdomen, which in about an hour abated, but was followed at 5 a.m. by intense sickness and vomiting. This continued intermittently till I saw her at noon. She was not in bed. She still complained of sickness, and of pain in the back and abdomen, not severe, but continuous. There was a slight appearance of hæmorrhage from the vagina. She was sent to bed, and for the sickness an effervescent saline medicine was ordered, along with a mustard poultice to the epigastrium. The urine, which owing to an oversight had not been sent to me for six weeks, was to be kept for examination. Soon after I left the vaginal hæmorrhage increased, and I was again summoned at 2.30 p.m. On my arrival it was evident that there had been considerable bleeding. Pain in the back, and to a less extent in the abdomen, was still complained of. On examination, it was found that the os uteri admitted a finger readily, but the cervix was not drawn up; the head presented; the placenta could not be felt in the lower uterine segment. The hæmorrhage had stopped, and there were no labour pains. Absolute rest in bed, with the application of a tight abdominal bandage, was all the treatment employed. I visited her again at 6 p.m. In the interval there had been no further bleeding, but the sickness and pain in the back were as before.

Having to leave town for a few hours, I gave instructions that Professor Stephenson, who had kindly consented to take charge of her in my absence, should be sent for in the event of further bleeding or of labour pains beginning. About 8 o'clock an urgent message was sent to him, but before his arrival a seven and a half months' fœtus, dead, but quite fresh, had been expelled, almost without warning, after two or three strong pains. There was no great hæmorrhage. The placenta was found to be covered almost in its whole extent with adherent black clots. About an hour after labour she was left in an apparently satisfactory condition.

She passed a fair night, save that she was much troubled with sickness; any attempt to take fluid, either water or milk and soda, caused vomiting. No urine had been voided. There was no evidence of bladder distension, but at 1 o'clock the nurse passed the catheter. Only ½ ounce of urine was drawn off. When this was examined it was found to contain one quarter albumen, while the deposit showed blood corpuscles, triple phosphates, and epithelial casts; urea, ·25 per cent.

I saw her again late in the afternoon and introduced the catheter, but no urine was obtained. The sickness still continued, but otherwise she

made no complaint of pain or discomfort. The temperature was normal; the pulse but little accelerated, and of no great tension; tongue clean and moist; skin dry and harsh. A hot fomentation was applied to the renal region.

19*th*.—Apart from occasional sickness she had passed a fair night. Vomiting occurred only on attempting to take fluids. The lochial discharge was small in amount and well under the average. No urine had been passed, but as there was no evidence of bladder distension the catheter was not used. Poultices were continued to the lumbar region, and a diuretic mixture was ordered. The mixture caused vomiting, however, as did everything save ice and iced water. Occasionally iced milk and soda in very small quantity was retained.

20*th*.—The symptoms and general condition were as before, save that she now complained of slight headache and some aching pain in the loins. No urine had been passed. Poultices were applied, and a hot pack ordered. A compound jalap powder was given, but as it was at once rejected an enema was administered.

21*st*.—No urine had been voided; pulse and temperature subnormal; pupils normal; the sickness somewhat moderated, but apt to be induced by taking any fluid. A pint of warm normal saline solution was injected into the rectum, and a hot pack given. The saline solution in part returned, but a few minutes later she passed 8½ ounces of urine, after which she expressed herself as much relieved. Analysis: urine slightly acid; specific gravity, 1010; urea, ·01 per cent., or 4 grains in all; a trace of albumen; pus and blood corpuscles in the deposit.

At 7 o'clock the same evening another injection of saline solution was given, followed two and a half hours after by a hot pack, after which she expressed a wish for hot fluids, and was allowed hot water, hot water and milk, a little tea, all of which she retained.

22*nd*.—A slight improvement was visible; temperature still subnormal; sickness now only occasional, most of the fluids she took being retained, as also a small quantity of thin cornflour. The same treatment was continued, but in the twenty-four hours only 4 ounces of urine were passed, which gave the following analysis: reaction, slightly alkaline; specific gravity, 1016; urea, ·6 per cent., or 12 grains in the twenty-four hours; albumen, ·15 per cent. by Esbach; deposit, blood and pus cells and triple phosphates.

23*rd*.—Little change in the general or renal condition, only a small quantity of urine—5½ ounces—being passed in the preceding twenty-four hours. In this there were 24¾ grains of urea and ·06 per cent. of albumen, while there were still some blood corpuscles in the deposit.

24*th*.—Considerable improvement; pulse and temperature normal, while the skin was much less harsh and inclined to perspire. During the twenty-four hours up to 4 a.m. on the 25th, 12 ounces of urine were passed, an analysis of which gave the following result: reaction; specific gravity, 1010; urea, ·9 per cent.; blood corpuscles; albumen, a trace. The patient looked very well, and expressed herself as very much better; indeed, notwithstanding the fact that up to this time—the seventh day—only 90 grains of urea had been secreted, she never looked really ill.

25*th*.—In the twenty-four hours ending 4 a.m. on the 26th, the quantity of urine passed was 49 ounces. Examined, it gave the following result: reaction, acid; urea, 1·15 per cent., or 232 grains in the twenty-four hours; albumen, ·01 per cent.; a few pus and blood cells. The patient seemed quite well. There was little tendency to sickness, almost all the nourishment she took being retained.

For the next few days there was marked polyuria, 64 ounces being passed on the 26th, while on the following day there were 72 ounces, which, on examination, showed an acid reaction, a specific gravity of 1010, with

·9 per cent. of urea and ·05 per cent. of albumen; there were no blood corpuscles or casts. On the next two days 96 ounces and 120 ounces were obtained, the analysis of which was similar to the above.

The urine was tested at intervals for some months, and contained a trace of albumen for about six weeks after labour.

This case has a peculiar interest in being the sole recorded instance—to which, at least, I have had access—of prolonged anuria after labour which ended in recovery.

CASE 2.—*Complete suppression of urine preceding and following premature labour at the beginning of the seventh month—Death—Child still-born.**

Mrs. S., aged forty-two, a spare woman of slender build and of a markedly neurotic temperament, was delivered of her first child, which is still alive, ten and a half years ago. Throughout the greater part of pregnancy she suffered from excessive nausea, sickness, and prostration. The urine continued free from albumen throughout. After labour, which was at term, and attended with an unusual degree of suffering, she made a good recovery. She has since had two miscarriages, the last six years ago. In both the pregnancies she was similarly affected with sickness and prostration, which in the first was so great as to cause considerable anxiety to the medical attendant, who on one or two occasions was on the point of inducing premature labour. Both, however, spontaneously terminated at the sixth month in the birth of dead children.

In the early months of the present pregnancy she suffered from a recurrence of vomiting and nausea, which, however, were not so severe, and passed off towards the end of the fourth month, after which she was in very good health. The urine was not tested on this occasion, the symptoms being so similar to those in previous pregnancies when the urine was found not to contain albumen.

Early in the morning of October 20, 1901, she was suddenly seized, in the beginning of the seventh month of pregnancy, with severe pain in the hypogastrium, followed soon by a slight discharge of blood from the vagina. She was seen at 8 a.m. by Dr. Gordon, who was struck by her waxy appearance, and her expression of great suffering. She was much troubled with sickness and retching, and had intense, continuous pain over the uterus, which was tender on pressure. There was no œdema. As examination showed no signs of commencing labour, a mixture containing ergot and morphia was given. Later in the forenoon the condition was much the same. For the abdominal pain, which was still very severe, a morphia pill was ordered every four hours.

At 6 p.m. she was still very sick; temperature subnormal; pulse regular and good; respiration at times laboured. Since early morning she had passed no water; the catheter showed the bladder to be empty. She was suffering so intensely that a hypodermic injection of morphia—$\frac{1}{3}$ grain—was given. At 9 p.m. she was seen along with Professor Stephenson. No urine had been passed, while her general condition was as before. Labour had not begun; another injection of morphia—$\frac{1}{4}$ grain—was given. She passed a fairly good night, but was very weak, and unable to retain anything save a few sips of tea. She had occasional attacks of precordial pain. There was little change in her condition next morning. With the catheter a teaspoonful of urine was drawn off, but it was mixed with the vaginal discharge, and useless for examination. It was observed that the hands and legs had become somewhat swollen.

True labour pains seem to have begun at noon, and at 4 p.m. she was

* For the report of this case I am indebted to Dr. John Gordon, of Aberdeen.

delivered of a fœtus which had evidently been dead for some time. So rapid was the latter part of the expulsion, and so severe the abdominal pain, that the woman was unconscious of its birth. The placenta could not be expelled, and was removed under chloroform about an hour after. The pain was little, if at all, relieved by the emptying of the uterus. At the beginning of and during labour the temperature was 97°.

In the evening she was found much easier. She passed a good night, but any attempt to eat brought on vomiting and pain.

22nd.—The patient was very weak, and unable to take nourishment; temperature, 99°; pulse, tolerably good. The catheter was twice passed during the day, but without result. Poultices were applied to the loins; pilocarpine was injected subcutaneously, and later digitaline and strychnine. In the evening she seemed fairly well and comfortable, though still troubled with sickness.

23rd.—She passed a quiet night, and slept a little. No urine was obtained during the day. At 10 p.m. she had what the nurse described as a rigor—probably a convulsion. Her temperature was found to be 97°, and in half an hour had fallen to 95°. When visited soon after by Dr. Gordon, her breathing was laboured, her pupils contracted, and her appearance so alarming that he asked Dr. Stephenson to see her. Injections of saline solution into the rectum were added to the treatment previously employed.

24th.—During the night she was very restless, with severe precordial pain. She asked for, and got, a few sips of tea, which she retained. At 6 a.m. she gave vent to a loud shriek, and cried that she was choking, while her face became contorted. She was seen soon after, when the temperature was found to be 95°, the pulse regular, and of moderate tension. No urine was obtained by the catheter.

At 11 a.m. inhalations of oxygen were tried, but she gradually became weaker, and died at 3.45 p.m., suffering great precordial pain, and conscious to the last. No post-mortem examination was allowed.

Case 3.—*Partial suppression of urine in a primipara lasting for three days after labour two weeks before term, followed by polyuria and recovery—Child alive.*

Mrs. N., aged nineteen, was admitted to the Maternity Hospital on October 26. She was advanced to within two weeks of the end of her first pregnancy. Previous to gestation, she had always enjoyed good health. In the early months she suffered merely from the usual subjective symptoms, but at the beginning of the ninth month she was suddenly seized with sickness and vomiting, attended with severe headache and pain in the back. As during the next ten days she had frequent recurrence of these symptoms, she sent for her medical attendant, who advised her to go to the hospital.

On admission she was seen to be of average build and well nourished. Though neurotic in temperament, she was not markedly so. There was no œdema. The catheter was passed, but only ½ ounce of urine was withdrawn, which became almost solid on boiling. Her temperature was 100°, her pulse 122. There was considerable tenderness in the left loin and over the left side of the uterus.

A few hours after admission labour spontaneously commenced, and dilatation proceeded rapidly, the first stage being completed in five hours. About an hour after, with the head lying on the pelvic floor, Dr. Stephenson applied the forceps under anæsthesia, on account of the condition of the woman and the urine, and completed delivery without trouble at 10.30 p.m. The child, a male, was alive, well nourished, and weighed 6½ pounds.

Soon after labour the woman began to suffer from sickness, with persistent retching and vomiting. The pulse and temperature were subnormal, the pulse falling at midnight on the 27th to 48. No urine was voided

within the first twenty-four hours. On passing the catheter only 4 ounces were obtained, which on boiling deposited one-third albumen. The lochial discharge was normal in quantity. Poultices were applied to the lumbar regions every three hours, rectal injections of saline solution were ordered every four hours, and she was given by the mouth sips of very hot water and milk and potass, of which she took 3 pints in twenty-four hours.

28*th*.—During the whole twenty-four hours the temperature, which was taken four-hourly, never rose above 97°, and was occasionally as low as 96°. The pulse was also subnormal, being only 44 at 4 p.m. This marked depression of pulse and temperature is especially noteworthy.

The vomiting and retching continued. During the day she took 3 pints of milk and potass, and 4 pints of hot water in occasional sips. Only 8 ounces of urine were obtained by catheter during this period; it contained one-third albumen. Poultices and saline injections were continued. A mixture containing digitalis and strychnine was ordered, and for the vomiting a mustard-leaf was applied to the epigastrium.

29*th*.—The condition was practically unchanged. There was marked apathy. The treatment was continued, and in addition 2 drachms of whisky were ordered every three hours, as well as ½ ounce of Hendry's solution of salts every four hours, which produced free action of the bowels. By catheterization 14 ounces of urine were obtained, showing one-fourth albumen.

30*th*.—Still apathetic and drowsy, but general condition improved. The temperature rose in the afternoon to nearly normal, while the pulse-rate increased. Vomiting and retching less severe, so that she was able to take about 8 pints of fluids, butter-milk, potass and milk, and hot water. Hendry's salts continued three times a day. She passed urine voluntarily throughout the day to the amount of 47 ounces, in which there was still one-sixth albumen. Bowels acted freely; lochia normal.

31*st*.—Still depressed and drowsy; vomiting much less frequent and severe. Quantity of urine 100 ounces, with one-tenth albumen; treatment as above.

November 1. — Continued improvement; little tendency to vomit; pulse 70; temperature normal; tongue furred; skin moist; complained of great thirst, though taking as much as 8 pints of fluid on an average per day. The quantity of urine was 84 ounces, with one-tenth albumen.

From this time the woman steadily improved. By November 4, or the ninth day, the urine was free from albumen, and so continued till she was dismissed from the hospital on November 11. She has since continued well.

The above case is interesting. The condition of the kidneys was probably similar to that in the other cases. She seems just to have escaped eclampsia through the premature onset of labour, and, it may be surmised, complete anuria, through artificial delivery under an anæsthetic.

The three previously published cases may be briefly presented as follows:

Case 4. — *Uræmic poisoning following suppression of urine after labour* (McCrea, *Canada Lancet*, Toronto, 1884, vol. xvi., p. 173).

On the evening of October 17 the author was called to attend a woman in her third confinement. Labour premature in eighth month; fœtus still-born; placenta and fœtus slightly decomposed. After delivery she com-

plained of pain in the lumbar region, and Dover's powder was administered.

18*th*.—The patient complained of sharp pain in the lumbar region, which was relieved by ½ drachm of tincture opii in starch enema; pulse and temperature normal. As no urine passed since confinement, digitalis and sp. ætheris nitrosi every two hours.

19*th*.—Still no urine; passed the catheter, but none obtained; pulse 86, temperature 100°; vomiting; pulv. jalap co., 30 grains.

20*th*.—Restless; pupils contracted; no pain; alkalies, diuretics, and diaphoretics. On the following day the patient was much the same, the pulse being 120, and the temperature 101°.

22*nd*.—Pulse 101, temperature 102°; slight clonic spasms and headache; slight perspiration; passive delirium, vomiting, hiccough, and contracted pupils. Next day condition very similar; bowels acted loosely; catheter passed, but no urine; patient evidently sinking.

24*th*.—Pulse 120, temperature 103°; vomiting, but no hiccough; sinking; appears somnolent and listless. On the following day it was noted that the breath was fœtid and ammoniacal, while there was free perspiration. The patient's condition became gradually worse; she became completely comatose, and died at midnight on the 27th, eleven days after the completion of labour.

Case 5.—*Suppression of urine following a normal but very rapid labour at term in a primipara—Child still-born—No symptoms during pregnancy—Death on the fifth day* (J. T. Williams, *Lancet*, 1886, ii., p. 248).

On March 26, 1886, Williams was called to a woman, twenty-two years of age and married, in labour with her first child. He had not seen her before. The child was born before his arrival, after a very rapid labour: still-born, and apparently at term. In the evening she was very comfortable, and to all appearance going on well. On inquiry it was found that she had vomited several times since labour, and had passed no urine, but there was no pain or distension of the bladder. Hot fomentations were applied over the hypogastrium, and soda-water and diluents ordered. On the following day no urine had been voided, and only 3 drops were obtained by the catheter. There was no pain, but she had vomited two or three times. A careful inquiry was now made as to her condition and previous history. She had always been healthy, never had scarlet fever, and there was no history of previous renal disease. Her temperature was 99°, pulse 88; tongue dry, with yellow fur; skin hot and dry. She was very quiet and uncomplaining; heart-sounds weak; no anasarca or headache; pupils active; lochia small in quantity. Hot fomentations to the loins were ordered, a diuretic mixture containing digitalis and nitrate of potass, 1 drachm of pulv. jalap co., and soda-water and diluents to drink.

28*th*.—Condition much the same, save slight dyspnœa; she had passed about 4 drops of urine, the catheter yielding ½ ounce, which was clear and pale, and contained one-sixth albumen. On the following day the bowels opened twice freely, but still no urine. By catheter 1½ ounces obtained, which showed blood and hyaline casts, and a large quantity of spheroidal epithelial cells like renal epithelium; specific gravity 1020, albumen one-eighth.

30*th*.—She passed a restless night, and was much weaker. The total urine secreted up to this time (the fifth day) was 2 ounces. The bowels acted twice; breathing not impaired; temperature 99°, pulse 86. She had vomited once or twice the evening before.

At nine p.m. Williams was sent for, as she was thought to have fainted; he found her dead. A wineglassful of urine had been passed since visit. She died suddenly without convulsions. No necropsy performed.

CASE 6.—*Suppression of urine following premature labour at the seventh month—Child still-born* (F. F. Bond, *Lancet*, 1889, ii., p. 431).

On January 9, 1889, Bond was called at 2 p.m. to see a woman who had been delivered by a midwife at two o'clock the same morning of a still-born child. She had advanced to the seventh month. There had been two previous confinements, the first seemingly at term, child alive; the second of a dead child at the seventh month. The woman was of an extremely nervous temperament, and subject to epileptic attacks. The labour had been rapid, and followed by rather severe hæmorrhage, which soon abated. She had intense after-pains when seen, but her condition was otherwise good. Bicarbonate of soda and opium were given.

On the following day she was almost free from pain, but suffered from vomiting; there was little lochial discharge; pulse 84, temperature normal. No urine had been passed. An effervescing mixture was ordered.

11th.—No urine passed; pain and vomiting had ceased; pulse and temperature normal; tongue clean. The catheter was used, but only a few drops of urine were obtained. In the evening there was intense pain over the loins; lochia scanty; catheter again passed, but no urine in bladder. Vaginal examination gave negative results; breasts full. Hot fomentations to loins and vulva were ordered, and a strong calomel and jalap purge, a morphia and belladonna suppository, and an effervescing diuretic.

12th.—One free stool, but no urine; pain over the loins intense; tongue dry; pulse 99, temperature normal; restless; catheterized, but no urine. A Simpson's bath ordered, and also an effervescent diuretic—vin. antimonialis, 10 minims; tinct. jaborandi, 30 minims—every three hours. In the evening much easier, perspiring freely, but no urine. There was a vesicular rash over the body.

On the 13th and 14th she was much the same, but on the 15th the vomiting and retching returned, and she was very restless; pulse and temperature subnormal. The same treatment was continued. She remained in much the same condition for the next two days, but on the 18th was very much worse; pulse 84, tension increased, temperature normal; vomiting and retching continued. She was now very drowsy, with occasional delirium. For the first time the breath smelt of urine. Convulsions set in at two p.m., and she died at six o'clock the same evening. No necropsy was allowed.

It is to be regretted that in not one of the cases was a post-mortem examination obtained. In endeavouring to explain the causation of the anuria, we are thus compelled to rely on the clinical records, which, though sufficiently full as to the symptoms accompanying the complication, are necessarily incomplete in respect to the condition of the kidneys which led up to it. Though there is a general similarity in the features of the cases, it is more than probable that they were not all dependent on precisely the same cause, or, to put it more correctly, as the causation is undoubtedly of a complex nature, that the contributing factors were variously combined in the different cases.

It may assist in the elucidation of the causal problem if a comparison is made of the leading features of the cases, and attention drawn to the more striking points of resemblance. This I propose to do under the following headings:

1. *Age.*—The age is noted in five of the cases, and with one exception the patients were young women under thirty. In the case in which the age is not stated it may with probability be inferred from the number of her pregnancies that the woman was young. Assuming her age was thirty, we get an average age of twenty-six, an age at which it is unlikely that they were the subject of chronic Bright's disease, the possibility of which is further excluded by examination of the urine during pregnancy, and by the subsequent history in the cases which recovered.

2. *Puerperal History.*—Two of the patients were young primiparæ, two were pregnant for the second time, while one was in her third and one in her fourth pregnancy. An inquiry into the history of the earlier pregnancies discloses several important facts which seem to have a bearing on the subsequent complication. In all the four multiparous women some abnormality, pointing to renal inadequacy, is found in the puerperal history.

In Case 1 the first pregnancy terminated prematurely in the birth of a macerated fœtus. The urine was tested a few days before the onset of premature labour, and found to be nearly solid with albumen. In Case 2, the first pregnancy, though resulting in the birth of a living child, was accompanied with great sickness and prostration; while the two following, during which the woman suffered even more acutely, terminated at the sixth month in the birth of dead children. In our fourth the condition of the woman is not noted, but, while the first child was born alive, the second was still-born at the eighth month. The history of the sixth case is very similar, the first child being born alive, the second still-born at the seventh month. The woman was subject to epileptic attacks, and was highly neurotic, a temperament which was specially noted in three of the other cases.

3. *History of Present Pregnancy.*—In two only of the cases were symptoms present of a severity to induce the patient to seek medical advice. In Case 3—that of partial suppression—the woman continued in excellent health till the beginning of the ninth month, when she was seized, quite suddenly, with sickness and vomiting, accompanied by severe headache and pain in the back. The urine, tested a few hours before the onset of labour, was almost solid with albumen. My own is the only other case in which the urine was examined during pregnancy. No symptoms were present, the woman expressing herself as in very good health, while the urine, tested on several occasions, was always found free from albumen.

In the other cases inquiry elicited nothing unusual in the course

of pregnancy, and the patients seem not to have been seen by the medical attendant before labour.

It is a noteworthy fact that in one case only did the pregnancy continue to term. In this case the child, though still-born, seems to have been recently dead. In three labour came on at the seventh month, in one at the eighth, while in the case of partial suppression labour was two weeks before term.

Equally striking, and of more importance in its bearing on the question of causation, is the mortality among the children. In the five labours which were followed by complete suppression the children were still-born, and in two, at least, the fœtus had evidently been dead for some time. In all, the women were fourteen times pregnant, and four times only did the pregnancy terminate in the birth of a living child.

In regard to the character of the labour, there is a very important ætiological fact to be noted. In four of the cases of total suppression the labour was unusually rapid, if not precipitate; the importance of this will be referred to later. In the fifth case the duration is not mentioned.

Slight accidental hæmorrhage immediately preceded the onset of labour in two of the cases, in one of which it was accompanied by excruciating pain. In only one case was there hæmorrhage in excess of the normal amount after labour.

4. *Post-partum Symptoms and Character of Urine.*—It is a well-known but none the less remarkable fact that total suppression of urine may exist for several days without giving rise to any urgent symptom. This was strikingly illustrated in almost all our cases. So well was the patient apparently and so free from symptoms that it was with difficulty that the friends could be persuaded of the gravity of the condition. As a rule, the woman expressed herself as comfortable and well. Pain in the back and headache, but not severe, were present in all save one, in which there was severe abdominal and precordial pain. The most uniform and striking symptom was vomiting. In my own case for the first few days, and in the second case all through, practically everything was rejected. In two of the cases there was well-marked depression of the pulse and temperature.

The later symptoms in the fatal cases were those that usually precede a fatal issue in suppression of urine: vomiting, drowsiness passing on to coma, muscular twitching, and contraction of the pupils. In two cases there were convulsions towards the close.

In regard to the urine, we find that in one only of the fatal cases

was any obtained. Half an ounce was drawn off by catheter on the third day; it was pale, clear, and contained one-sixth albumen. On the fourth day 1½ ounces were obtained, with a specific gravity of 1020, and showing blood and hyaline casts and a 'large quantity of spheroidal cells like renal epithelium.' About two hours before death, which took place suddenly and unexpectedly on the fifth day, 1 ounce was spontaneously passed.

Of the two cases which recovered it will be noted that in the first only 30½ ounces of urine were secreted during the first eight days. Save ½ ounce obtained by the catheter on the day following labour, and which was probably in the bladder during it, no urine was obtained till the fourth day, when 8½ ounces were passed after a saline injection into the rectum. This contained only 0·01 per cent. of urea, a trace of albumen, and a few blood corpuscles in the deposit. On the following day 4 ounces were passed, with the following analysis: specific gravity, 1016; urea, 0·6 per cent.; albumen, 0·15 per cent.; and still a few blood cells.

On the next three days 5½ ounces, 12 ounces, and 49 ounces were passed respectively, with an increase in the urea percentage and a diminution in the albumen. After this there was well-marked polyuria. Convalescence was slow, and the albumen did not entirely disappear for six weeks. In the second successful case the urine was solid with albumen a few hours before the onset of labour. During the first twenty-four hours after its completion none was voided, and with the catheter only 4 ounces were obtained, which on boiling deposited ⅓ albumen; on the next day 8 ounces, with still ⅓ albumen; on the next 14 ounces, with one-quarter albumen; and on the following day 47 ounces, and thereafter polyuria. By the ninth day the albumen had entirely disappeared, and from that time the woman made a very rapid recovery.

The re-establishment of the renal secretion in these two cases was preceded by a distinct amelioration in the sickness and vomiting, and this may, I think, be regarded as one of the earliest favourable signs.

5. *General Conclusions.*—It will be observed that in all the cases of complete suppression—with the exception, perhaps, of Case 2—the symptoms conform to those usually ascribed to the obstructive form, the anuria extending over five to eleven days, and being unattended at the outset with any urgent symptoms. Though Bond was of opinion that the complication was the result of the impaction of calculi in both ureters, there are facts in connection with the cases which make it very difficult to accept the view that they were instances

of so-called obstructive anuria. In the case of partial suppression, for example, there was evidently a condition of the kidneys similar to that underlying eclampsia, and which brought the woman after labour to the brink of complete suppression; but a stronger objection is furnished by the fact that in all five cases of complete suppression the children were not only still-born, but in every instance save one were premature. It is obvious that there existed some cause which led to the death of the fœtus. In this cause we shall find the explanation of the suppression. McCrea was of opinion that the anuria was due to the absorption of decomposing matter in connection with the dead fœtus *in utero*, which he thought had given rise to blood-poisoning, a conclusion to which, he held, the symptoms strongly pointed. In no other case, however, is the fœtus described as decomposing. In my own it was fresh, and death was known to be recent, as movements had been felt on the previous day.

It is much more likely that the fœtal death and the post-partum anuria were dependent on a common cause. What this cause was can only be conjectured, but in all probability there was toxæmia from nephritis of a character similar to that which is now believed to produce eclampsia. That renal inadequacy existed before the occurrence of the last pregnancy is at once suggested by the puerperal history. In all the four multiparous women the previous labour resulted in the premature birth of a still-born child.

It is unfortunate that in two of the cases only was the urine examined during pregnancy. In one, a secundipara, no albumen was found six weeks before labour, though in the previous pregnancy the urine contained a large quantity of albumen; in the other the urine, tested a few hours before labour, became solid on boiling.

The whole puerperal history seems, then, to point to the existence of some defect in one or in both kidneys which rendered them unequal to the increased strain of pregnancy and exposed them during it to nephritis. But, while the nephritis of pregnancy is common and the condition of the kidneys which obtained in our cases probably not infrequent, complete suppression of urine after labour is very rare. In general, even in the most serious cases of nephritis which result in eclampsia, the activity of the kidneys is rapidly restored after the uterus has been emptied. In these complete suppression is rare, and in not one of our cases did convulsions precede suppression.

It is clear, then, that we must look for some other factor to explain the occurrence of anuria. That, I think, is to be found in the character of the labour. In five cases this is noted, and in all the labour was unusually rapid. In my own case it might fairly be

described as precipitate. Though little danger is, in general, to be apprehended from undue rapidity of labour, yet in highly neurotic women it occasionally produces an unexpected degree of shock and collapse, more especially when it is the result, not of a diminished resistance, but of an undue severity of the pains. Having recently seen a case of this kind, I am the more inclined to believe that the pain and shock, associated with precipitate labour, constitute an important element in the causation. In discussing the ætiology of non-obstructive suppression Fagge* mentions that the shock accompanying rupture of the uterus may produce a temporary anuria, which passes off as the patient recovers. It is probable that he had in view an actual case, but no reference is given, and I can nowhere find record of such a case.

It is only in nervous, high-strung women that undue rapidity of labour is liable to occasion alarming symptoms, and there can be no doubt that a neurotic temperament plays a considerable part in the production of anuria following labour. In four of the cases the women were expressly stated to be neurotic.

It should be observed that in Case 2 suppression seems to have preceded the onset of labour, but here the woman suffered both before and during labour from intense pain, which was probably the immediate cause of the suspension of the renal function.

In the absence of post-mortem evidence the causation must still be regarded as obscure. While this is so, the following would seem, from an analysis of the clinical conditions present, to be the more important factors concerned in the production of post-partum anuria:

1. A pathological condition of the kidneys—probably nephritis—resulting from pregnancy, but in some cases dependent on a pre-existing defect of the organs, congenital or acquired.

2. A neurotic temperament. The influence of this on the renal secretion is seen in hysterical suppression.

3. The shock incident to an undue rapidity of labour, or arising from excessive pain. This seems in all the cases to have been the exciting cause.

The *treatment* of suppression of urine after labour does not differ in any way from that to be followed in the same condition apart from pregnancy, and is so fully described in text-books of medicine that it need not be further discussed. Attention may, however, be called to one or two points suggested by a perusal of the cases.

It is very important that efforts to restore the function of the kidneys, and to supplement them till that is accomplished by

* 'Principles and Practice of Medicine,' vol. ii., p. 669. Second edition.

increasing the activity of the accessory channels of excretion, should be instituted *without delay*. In almost all the cases much valuable time was lost through failure to immediately realize the gravity of the condition. Whether the result would have been different if energetic treatment had been resorted to earlier it is impossible to say. As an addition to the measures usually recommended, the injection of saline solution into the rectum will be found useful. It proved the most effective remedy in my own case, though it was tried by Dr. Gordon without success.

Another interesting and important point arises in connection with the use of opium. In all the fatal cases save one it was given chiefly for the relief of abdominal or lumbar pain, and it becomes a question whether it had any detrimental influence on the kidney secretion, and was in reality a factor in the production of suppression. Did it in any way interfere with the restoration of the renal function? While admitting the possibility, I am disposed to think that it did not, for the reason that in one of the fatal cases opium was not given, and, further, that morphia does not produce this effect in cases of eclampsia, in which, probably, the condition of the kidneys is very similar. At the same time, I am of opinion that opium should be rigidly withheld in cases in which anuria is to be feared.

EXPULSION OF DERMOID OVARIAN CYST *PER VAGINAM* DURING LABOUR

WITH A DISCUSSION ON THE OPERATIVE TREATMENT OF PELVIC OVARIAN TUMOURS COMPLICATING LABOUR.*

By F. W. N. HAULTAIN, M.D., F.R.C.P.E.,

Lecturer on Midwifery and Diseases of Women, Edinburgh School of Medicine.

THE extreme rarity of an occurrence such as the title of this communication indicates appears to me a sufficient excuse to put it on record.

Mrs. K., aged thirty-two, 3-para, was sent into the Maternity Hospital on July 17, 1901. She had been in labour for twenty-four hours, and the membranes had ruptured twelve hours previously. As the delay in delivery had been recognised to be due to the presence of a soft swelling bulging through the posterior vaginal wall, an attempt at delivery by means of forceps had been made, with the result that a mass had protruded from the vulva, and was pushed back into the vagina. On examination after admission the mass was felt in the vagina, but labour-pains had entirely ceased. Dr. Underhill was sent for, and kindly asked me to accompany him. On introducing the whole hand into the vagina the mass appeared to lie in the canal, and on being grasped to pull down for inspection it became detached and was removed. On casual examination it presented the dark red appearance and softness of an œdematous polypus about the size of a small cocoanut. As the woman had already been so long in labour, forceps were immediately applied to the engaged fœtal head, and a living male child was easily delivered. The third stage presented nothing abnormal, but as free manipulations had been made it was decided to thoroughly wash out the genital tract. On introduction of the fingers to guide the nozzle of the syringe they passed through a rent in the posterior vaginal wall, and suspicions were at once aroused that the tumour might have been extra-vaginal and burst its way through the tear. The tumour was now more carefully examined and incised, when it was found to be a dermoid cyst containing hair and much sebaceous material, indicating an ovarian origin. The rent in the vagina was now packed with a strip of iodoform gauze about 2 inches wide and 4 feet in length, and the vagina douched with antiseptic solution.

The progress of the patient was one of uninterrupted recovery. The after-treatment consisted in the daily dragging out of about a foot of gauze till it was entirely removed on the fourth day. Subsequent microscopic examination of the cyst corroborated the impression of its ovarian origin.

I have found four similar cases of expulsion *per vaginam* recorded; three of these, by Luschka, Lomer, and Berry, are tabulated by Playfair in a paper read before the London Obstetrical Society, while the fourth is recorded by Treub.†

* Read before the Edinburgh Obstetrical Society on February 12, 1902.

† *Bulletin Société d'Obstét. et Gyné. de Paris*, April 21, 1898.

In each of these, as in my case, forceps was used in the delivery. Four of the five mothers recovered, but with the exception of the case I have described all the children were born dead. I have also found six cases recorded of expulsion of ovarian tumours *per anum* during labour; in four of these the result was fatal to the mother, in one the expulsion was completed by unaided uterine action.

Perhaps the main feature of practical importance in the consideration of these cases is the question of the management of labour if obstructed by similar impacted pelvic tumours. Fortunately this complication is rare, and may be said to occur once only in 4,000 cases. But if labour be left to the spontaneous efforts of nature a maternal mortality of 50 per cent. has been shown, a result which makes it incumbent that prompt and energetic treatment should be adopted.

The recognised modes of management may be summarized as follows:

1. Postural reposition of tumour into abdomen.
2. Artificial delivery *per vias naturales:*
   (*a*) Without diminishing size of tumour.
   (*b*) After diminishing size of tumour.
3. Cæsarean section and ovariotomy.
4. Vaginal ovariotomy.

In considering the relative value of these procedures, one must turn attention in the first place to statistical evidence. This has been most efficiently collected by McKerron in his exhaustive and classic monograph entitled 'The Obstruction of Labour by Ovarian Tumours in the Pelvis,'* from which I quote. It may be summed up as follows:

	Cases.	Deaths.	Per cent.
Reposition	41	5 =	12
Artificial delivery ...	49	24 =	49
Disintegration of tumour ...	33	4 =	12
Cæsarean section	10	8 =	80
Vaginal ovariotomy	3	0 =	0

From a general review of these figures one fact stands out pre-eminently, and may at once be accepted—viz., that forcible delivery by dragging the child past the obstruction is a mode of procedure of such danger to the mother that it should never be attempted, and may at once be eliminated from the legitimate methods of treatment.

* *Obstet. Trans.*, London, 1897.

Comparison of the remaining methods reviewed is exposed to many fallacies, and must be considered with deliberation. In this way Cæsarean section, as employed in the cases recorded, has accorded to it a mortality which with the more enlightened methods of operating of the present day cannot be accepted as a true interpretation of its value. In like manner with our improved antiseptic methods, it is questionable if the death-rate after disintegration of the tumour would not be further reduced, while the number of cases of vaginal ovariotomy is so small that a true estimate of its value cannot be formed. Reposition of the tumour, on the other hand, involving as it does slighter risks, may be looked upon as offering the principal mode of treatment adopted before operative measures were so readily undertaken as they are now, and may be taken as giving a fair average result of this method of management.

It will thus be seen that the results obtained by reposition and simple disintegration offer almost equal success—viz., a maternal mortality of about 12 per cent., a death-rate surely far beyond what may be reasonably expected from the operative methods now at our disposal.

The cause of death in both of these methods of treatment in the majority of cases is shown to be peritonitis, set up by injury to the tumour by pressure, twisting, and tearing. It would thus appear that the early removal of the tumour should be the treatment aimed at. This result may best be attained (1) by vaginal ovariotomy before delivery; (2) by ovariotomy as soon as possible after delivery, either after reposition or disintegration of the growth before expulsion of the child.

Vaginal ovariotomy has, as has been stated, been performed three times without a fatality by Rubeska, Stande, and Rapin. This result, which if taken in conjunction with the extraordinary successful termination of those spontaneously expelled, certainly strongly supports such a mode of procedure. Further, should an attempt at extirpation during labour be unsuccessfully attempted, the condition of the patient is no worse than if mere disintegration had been employed, as the tumour may subsequently be removed *per vaginam* or abdominally.

To my mind vaginal ovariotomy is a safe, and at the same time a ready, method of treatment. In these cases the tumour, to be intrapelvic, must be small, and, being pushed down in front of the advancing child, can be comparatively easily reached, while the incision through the vaginal wall is the same as that required for simple disintegration. From every point of view it commends itself

as the operation to be employed by the isolated general practitioner, as its efficient performance requires a very small armamentarium as compared with that necessary for laparotomy. After ligature of the pedicle and removal of the tumour, I would prefer to stitch up the vaginal wound before attempts at delivery be commenced, so as to avoid further tearing of the vaginal wound during the passage of the child; but should uterine contractions expel the child before suturing can be done, packing and draining with sterilized gauze alone may be adopted, as in the case mentioned.

Abdominal ovariotomy within twenty-four hours of delivery has been performed on several occasions with unfailing success, and there seems no reason to suppose that it should be more dangerous during the puerperium than usual. It may be looked upon, therefore, as offering a mode of treatment with a mortality of less than 5 per cent., which is less than half that attained by disintegration alone, or even reposition. It has the disadvantage of requiring elaborate preparations for its efficient performance, which frequently cannot be attained, and, further, that it has to be performed in many cases in, one might say, 'cold blood'—*i.e.*, after the delivery has been accomplished and the patient is probably comfortable, though perhaps slightly exhausted. Yet, when we consider the high mortality of 12 per cent. after simple reposition, it appears to me a justifiable undertaking after reposition whenever surrounding circumstances admit of its being properly performed, as it is only anticipating the necessary operation by a few weeks, and removes the immediate risks of a possibly injured tumour. Further, the patient by this means is saved a double period of being laid aside, the necessary period of confinement during the puerperium being occupied by the convalescence after laparotomy. After free disintegration of the tumour during labour, if unable to remove it *per vaginam*, laparotomy should in all cases be performed as soon as conveniently possible.

To sum up shortly, then, what might be proposed as the method of treatment in cases of labour obstructed by intra-pelvic ovarian tumour, I would suggest that on recognition of the condition the alternative methods of simple reposition, vaginal ovariotomy, and reposition with subsequent early ovariotomy, should be carefully weighed, and one or other adopted according to the surrounding circumstances.

Where the conditions admit of vaginal ovariotomy being satisfactorily attempted, I would be inclined to advise this method of procedure even in preference.

Should reposition have been successfully performed, subsequent

removal of the tumour within twenty-four hours seems to me quite a method of treatment to be recommended, if the surroundings admit of efficient operating.

In a certain proportion of cases operative procedures are contra-indicated on account of difficulties more particularly associated with the environments than anything else. In these, simple reposition and trusting to luck is the only mode of procedure, but to my mind this is not to be followed so rigidly as has hitherto been recommended. Doubtless, the recommendation of the removal of the growth during or shortly after labour appears at first sight somewhat heroic advice, but it is, I consider, justified by the high mortality which obtains under the present modes of treatment by simple reposition and disintegration of the tumour, and which it is desirable should, if possible, be reduced. At the same time, the management of this dangerous complication is to my mind worthy of more consideration; as, so far as I can learn, it has hitherto been but lightly dwelt on.

I have purposely refrained from entering into statistical details and discussing the ordinary methods of treatment, as these have been fully described in Dr. McKerron's comprehensive monograph. I have confined myself entirely to the question of operative procedure, which, from our improved knowledge of technique and asepsis, has been largely shorn of its terrors, and offers, I venture to think, the only method by which we can reduce the mortality from this complication of labour, which must be considered at present undoubtedly excessive.

CARDIAC DISEASE IN PREGNANCY AND PARTURITION, WITH NOTES OF THIRTEEN CASES.

By ROBERT JARDINE, M.D., F.R.S.E.,

Senior Physician to the Glasgow Maternity Hospital; President of the Glasgow Obstetrical and Gynæcological Society; Examiner in Midwifery to the University of Glasgow.

UNDER ordinary conditions heart disease in any of its forms is a very serious complaint. When it occurs during pregnancy, or, what is more usual, when pregnancy occurs in a patient with old-standing heart disease, the gravity of the condition is very great. In most text-books of midwifery the amount of attention paid to this serious complication is exceedingly small. In a recently-issued text-book of over 800 pages, about two pages are devoted to its discussion. Twenty-three years ago the late Dr. Angus Macdonald of Edinburgh published a very valuable monograph on this subject, and forcibly drew attention to the very inadequate way in which it was usually dealt with by obstetric authors. If the complication were an exceedingly rare one authors might be excused, but this can hardly be maintained. I have seen a good many cases now, and recently I had seven cases of cardiac disease of pregnancy under treatment within a month, this fact proving that the complication is not a very rare one.

I shall now give notes of these and a few other cases which I have treated in hospital and in private, and then shortly discuss the whole subject. These cases I have selected to represent the different lesions as far as possible. I have not yet met with a double aortic lesion.

CASE 1.—*Aortic Incompetence—Premature Labour.*—Mrs. C., aged forty-two, multipara, came to me complaining of cough, breathlessness, and swelling of the legs. She had had five live children, one stillborn, and three abortions. After her first confinement twenty years ago she had had rheumatic fever. On examining her chest I found bronchial râles all over the lungs, and evidence of œdema at the bases. There was marked pulsation in the carotids. At the base of the heart a blowing diastolic murmur was heard well conducted down the sternum. At the apex there was no murmur to be heard. The apex-beat was displaced outwards, but as she was a very stout woman it was impossible to make out the exact size of the heart by percussion. Menstruation was regular. The bronchitis soon yielded to treatment, and I then put her on Easton's syrup.

A short time afterwards menstruation ceased, and at first she ascribed this to the menopause; but as morning sickness began I examined her,

and found that she was pregnant. I then put her upon strophanthus. She did fairly well until the seventh month, when œdema of the legs returned, and breathlessness became very troublesome. The question of the propriety of inducing labour arose, but I was loath to do this. My difficulty was solved by premature labour coming on of itself. The labour was fairly quick, and the strain not very great. The child was stillborn. There was a considerable amount of post-partum hæmorrhage, but not excessive for such a plethoric woman.

She made a very good recovery. At present, nearly four years later, she is enjoying fairly good health. She has only menstruated once in the last six months.

Case 2.—*Aortic Stenosis—Labour at Full Time.*—J. C., aged twenty-six, 2-para, admitted December 30, 1901, delivered January 8, 1902.

This patient was not in labour when admitted, but on account of cough, extreme breathlessness, and great œdema of the legs, it was deemed advisable to keep her under observation in hospital.

Previous history: She had had scarlet fever at seven years of age, from which she had made a good recovery, but for the past eight years she had been much troubled with rheumatic pains in her joints. Three months ago cough and breathlessness had set in, and the breathing had become exceedingly embarrassed on exertion. She had had no difficulty during her former pregnancy.

Cardiac condition on admission: The pulse was 80, and of fair tension. The apex-beat was ½ inch outside the vertical nipple-line. The right border was normal in position. Auscultation revealed a harsh systolic murmur, heard with maximum intensity over the aortic area, and conducted into the vessels of the neck. A very slight thrill could be occasionally detected over the aortic area. The swelling of the legs and ankles was extreme, and there was a very marked degree of capillary varicosity of the veins. The urine was pale straw-colour, with a slight deposit of urates, but no albumin. She was kept at absolute rest, and given an expectorant and cardiac tonic.

Labour set in on the night of January 8, and although strict injunctions had been given that the resident was to be advised of the fact, no intimation was given him until the third stage had lasted three hours, and no progress was being made. He found the patient was completely exhausted, with an irregular pulse of 120. The pains were very feeble. An inhalation of amyl nitrate was given, and a hypodermic injection of strychnine $\frac{1}{30}$ grain and digitalin $\frac{1}{50}$ grain. Delivery was effected by forceps under chloroform. Free bleeding was allowed to take place post-partum, and then the uterus was firmly rubbed till it became well retracted. The patient has made a good recovery.

Case 3.—*Aortic Stenosis with Mitral Stenosis and Incompetence—Labour at Full Time.*—Mrs. A., aged twenty-five, 3-para, admitted December 15, 1901, delivered January 2, 1902.

This patient was admitted to hospital suffering from cough, breathlessness, and palpitation, dating from the quickening, but aggravated during the fortnight prior to admission. She had also been very hoarse for three weeks.

Past history: She had never had scarlet fever, or rheumatic fever, nor had she ever manifested any symptoms of subacute rheumatism. During her first pregnancy she had been perfectly well, but had suffered slightly from breathlessness during the latter third of her second. There was no indication of syphilis.

Inspection of the cardiac area revealed diffuse pulsation in the fourth and fifth interspaces, while marked pulsation could be detected in the suprasternal notch and in the veins of the neck. Palpation revealed marked pulsation in the second, third, fourth, and fifth interspaces, accom-

panied by a well-defined thrill of a rough, grating character, and preceding the apical impulse. On percussion the transverse area of cardiac dulness was found to measure 4¼ inches, and this was continued upwards and towards the middle and left of the manubrium sterni by a narrow neck 1½ inches broad. Auscultation over the mitral area revealed a rough, rumbling murmur, limited in distribution and running up to the first sound, which was obscured by a soft blowing systolic murmur following upon the termination of the presystolic one. The systolic murmur was well conducted into the left axillary region. Over the aortic area and mid-sternum a somewhat harsh systolic murmur was heard; it was conducted into the vessels of the neck.

The aphonic condition associated with the pulsation in the suprasternal notch and the area of percussion dulness over the upper and left border of the sternum led to a suspicion of aneurism; but although a systolic murmur could be heard over the trachea, there was no evidence of inequality of pupils or radial pulses, dysphagia or tracheal tugging. Laryngoscopic examination showed a somewhat anæmic condition of the larynx and a tumefaction of the vocal cords and of the aryepiglottic folds. Movements of adduction and abduction of the vocal cords, though a little tardy, were quite free. Lungs: Bronchitic râles were heard in the left. The pulse was 90, and slightly irregular. The urine contained 5 per cent. albumin and triple phosphates.

The patient was kept in bed on milk diet and imperial drink, and given a mixture containing digitalis, strophanthus, acetate and citrate of potash. She was also given an inhalation of menthol and tr. benzoini co. Her condition quickly improved. The pulse became regular and the heart's action quiet, while the cough and aphonia lessened. Every night she complained of pains in the lumbar region, which seemed to be false labour pains.

On January 2 labour set in with strong pains. The first stage only lasted an hour and a quarter, and the second only eighteen minutes. No instrumental interference was adopted, as there was no cardiac embarrassment. A fair amount of bleeding was allowed in the third stage. She made a good recovery.

Case 4.—*Mitral Incompetence—Pleuro-Pneumonia and Sciatica—Premature Labour.*—Mrs. B., aged twenty-nine, 4-para, seven months pregnant. Two of the former children had been stillborn, and the last one had only lived a fortnight. At the second confinement the placenta had been very adherent. There was evidence of syphilis, and the woman was a heavy drinker.

I found her suffering from severe pain in the right side, shortness of breath, and cough. She also complained of intense pain along the left sciatic nerve. Her temperature was 103·4° F., and the pulse 130. The lower lobe of the right lung was becoming consolidated, and there was also evidence of friction. The left lung was free. There was a very loud systolic murmur at the apex of the heart. It was well conducted to the back of the chest. The apex-beat was displaced outwards. The patient had been very ill for two days. The child was alive. Mustard poultices were applied to the side, and she was put on carbonate of ammonia, iodide of potash, digitalis, and senega. Next day the sciatica was so bad I had to give her Dover's powder, 12 grains every four hours. On the sixth day of the illness I saw her about 10 a.m. There was then no evidence of labour; but in about two hours it commenced, and the fœtus was expelled by the breech in about half an hour. The nurse who attended her found the body born when she reached the house. There was no sign of life in the child, and no indication of asphyxia. The placenta came away in about half an hour, but neither it nor the membranes were satisfactory, so I passed my hand into the uterus and cleared out some bits of

placenta and membrane. The placenta had apparently been separated by a clot, which had lacerated it. There had been a fair amount of bleeding, but no active post-partum hæmorrhage. The pulse was feebler, but did not show evidence of collapse. She was given a large dose of digitalis, and whisky freely. The temperature was 103° F. Two days later the crisis occurred, and the lung quickly cleared up. The sciatica did not trouble her much after delivery.

CASE 5.—*Mitral Incompetence—Great Œdema of the Legs, Body, and Lungs—Labour at Full Time.*—This patient was a multipara, about forty years of age. She had had heart disease for a good many years, and several times had been very dropsical. I was asked by a mission-nurse to see her. The condition of the patient seemed very critical. She was propped up in bed panting for breath. The legs, body, and face were very œdematous, and her lips were quite blue. She had a very troublesome cough, and was spitting up bright blood. Her pulse was very quick and irregular. The heart was greatly dilated. There was a loud systolic murmur at the apex conducted round into the back. The lungs showed evidence of extreme engorgement. She was within a few weeks of full time.

She was given carbonate of ammonia, digitalis, and senega. In a day or two there was marked improvement, and she was able to lie down. I was afraid that her heart would not stand the strain of labour, but my fears were groundless. One night she felt very thirsty, and rose to get a drink. As she was crossing the floor, she was seized with a single pain, which shot the child out. The cord broke a few inches from the umbilicus. The child was alive, and showed no evidence of injury. The patient was put back into bed, and the nurse hurriedly called. The placenta came away naturally, and the nurse considered the patient was so well that she thought it was not necessary to disturb me. Next morning I found the patient was wonderfully well, and she made a good recovery. The child developed bad congenital syphilis, and died in a few weeks.

Twice afterwards I was called to see this woman when she was almost at death's door from failure of compensation, and I was able to patch her up. She was never pregnant again. She died last year, but not under my care.

CASE 6.—*Mitral Stenosis—Labour at Full Time.*—Mrs. McA., aged thirty-five, consulted me in 1894. She had been married some years, and was very much disappointed that she had never had a child. On questioning her, I found that she had had rheumatic fever three times, and on examining her heart a presystolic murmur was heard at the apex. The thrill could be distinctly felt. Her pelvic organs appeared to be normal. I told her that she ought to be thankful that she had never been pregnant, and that for her sake I hoped she never would become so.

About a month later she had a very bad attack of breathlessness, and began to cough up blood. I found her propped up in bed. Her lips were very blue. The base of both lungs showed marked œdema, and as her temperature was raised I was afraid it would end in a double pneumonia. Mustard poultices were applied, and she was put on large doses of carbonate of ammonia and digitalis. She was much relieved in a few hours, and made a good recovery.

A few months later she came to tell me that menstruation had ceased for two periods. She said she had no sickness, and was feeling perfectly well. She had had one or two attacks of breathlessness since her illness, but had taken some digitalis and ammonia, which had quickly freed her from this symptom. I found she was pregnant, and, although I had told her of the great risk she ran, she was quite pleased at the prospects of having a child. I advised her to take strophanthus in tabloid form—2 minims three times daily during the whole pregnancy. She went to

full time without a day's sickness, and said that she had never enjoyed better health. Only once or twice did she have any breathlessness.

When labour set in I gave her a large dose of strophanthus. In about six hours from the onset of labour, when the os was nearly fully dilated, her breathing began to be embarrassed, and her lips became blue. I had sent for assistance, but her condition became so bad that I took the great risk of giving her chloroform alone, and applying the forceps after fully dilating the cervix. The child was alive. After the placenta came away she bled freely, and I allowed her to do so. The pulse, which had been 56 before delivery, rose to 112. An hour after delivery I gave her 5 minims of strophanthus, and during the night she had 4 minims every three hours. She made an excellent recovery. The cardiac tonic was continued during the puerperium.

Case 7.—*Mitral Stenosis—Labour at Full Time.*—Mrs. B., aged twenty-four, 2-para, was admitted to the Glasgow Maternity Hospital, on March 13, 1899, complaining of cough, breathlessness, and swelling of the legs and back of six weeks' duration.

Three years ago, prior to marriage, the patient was in the Royal Infirmary of Glasgow, under treatment for an attack of acute rheumatism. She was married two years ago, and one year ago she had her first child. Whilst she was carrying the first child, she suffered a good deal from swelling of the feet, breathlessness, and cough, but not to such a marked extent as on the present occasion. The patient states that for the last six weeks she has been quite unable to lie down at night on account of her breathlessness. She calculates that she is about seven and a half or eight months pregnant.

Condition on admission: Patient was pale and anæmic-looking. There was well-marked œdema of the lower limbs—more marked on the right side—also over the sacrum. There was no swelling or œdema of the face.

There was a troublesome cough and marked dyspnœa, with a tendency to cyanosis. No spitting of blood. Examination of the lungs showed impairment of resonance at both bases, together with weakened respiratory murmur and a few fine râles. Nothing at the apices.

Heart: Marked impulse just within the nipple-line. On palpation a well-marked presystolic thrill could be felt. On percussion the area of cardiac dulness extended on the left to 3 inches to the left of the midsternal line, on the right to the midsternal line, and above to the lower border of the third costal cartilage. On auscultation a well-marked presystolic murmur, followed by a very rough first sound, could be heard. Over the pulmonary area there was well-marked reduplication of the second sound.

The fœtal heart-sounds were audible. During her stay in hospital we frequently failed to hear the fœtal heart-sounds for days at a time, and yet the child was alive. The patient's urine contained a trace of albumin.

She was put upon tr. strophanthus (10 minims), caffein citrate (2 grains), and pot. iodi (5 grains) every four hours. In a few days the swelling of the limbs and trunk had disappeared, the cough and breathlessness were gone, and the patient could lie down. The albumin had disappeared from the urine. She remained well until April 23, when labour set in. The os dilated rapidly, and as soon as the first stage was completed chloroform was given, and delivery effected by forceps. There was no post-partum hæmorrhage. She made an uninterrupted recovery. The child, a female, was alive.

Case 8.—*Mitral Stenosis—Labour at Full Time.*—Mrs. W., aged twenty-nine, 1-para. Admitted December 19, 1901; delivered same day, full time. This patient, on admission, felt very well, and suffered no discomfort. Lividity of the ears, lips, cheeks, and tip of the nose led to the suspicion of a mitral lesion, and auscultation revealed a well-marked presystolic murmur in the mitral area. The thrill could be distinctly felt.

As the second stage was prolonged, chloroform was administered and forceps applied. Free bleeding was allowed to take place. She made an uninterrupted recovery.

In this case there must have been well-marked compensation, as she had not suffered any inconvenience during the pregnancy. During the labour there was nothing to show that the heart was affected. I think it was probably a case of congenital stenosis. I know of a case of mitral stenosis, which I believe to be congenital, where two labours have been passed through without the least difficulty. More than once I have discovered cardiac lesions after delivery where the condition was not suspected at the labour.

Case 9.—*Mitral Stenosis and Incompetence—Labour at Full Time.*—Mrs. B., aged twenty-seven, 2-para, full time, admitted to the hospital December 17, 1901; delivered December 18. On admission the patient was very pallid, and presented considerable œdema of the legs and vulva. For a month prior to admission she had suffered from headache, vertigo, sickness, and transient amaurosis. The symptoms, coupled with the œdema of the legs and genitalia, led to the examination of the urine, which was found to be of a pale straw-colour, but without a trace of albumin. On examining the heart a pronounced presystolic thrill could be felt, and a well-marked presystolic and a systolic murmur heard over the mitral area.

The os was sufficiently dilated to admit two finger-tips, but the pains, although recurring frequently and strongly, were not having much effect on the cervix. As the patient had a very pendulous abdomen, a firm binder was applied. This did not cause any cardiac discomfort.

A hypodermic injection of digitalin and strychnine was given on admission, and digitalis and strophanthus by the mouth every two hours afterwards. The pains became few and feeble, so 10 grains of quinine were given to stimulate the uterus. Two hours later the pains became stronger, the os dilated very slowly, and as the patient was becoming worn out a mixture of chloroform and ether (2 to 1) was administered; the remainder of the dilatation was finished manually, and delivery effected by forceps. There was very little bleeding. The patient was very weak after delivery, but there was no cardiac embarrassment.

The cardiac tonic was continued throughout the puerperium, and the patient was not allowed to nurse. She left the hospital feeling very well.

Case 10.—*Mitral Stenosis and Incompetence—Albuminuria—Labour at Full Time.*—Mrs. W., aged twenty-four, 1-para. Admitted December 23, 1901; delivered December 27, full time. This patient was admitted from the West-End Branch of the hospital on account of œdema of the feet, legs, face, and vulva. She had not suffered from any discomfort beyond that due to the swelling in the parts. The urine, which was scanty in amount and high-coloured, was loaded with albumin. Esbach's albuminometer gave 8 per cent.

Percussion of the area of cardiac dulness revealed a transverse measurement of $4\frac{1}{4}$ inches. A well-marked presystolic thrill was felt over the mitral area, and auscultation elicited a presystolic and a systolic murmur over that region. There was, in addition, a slight whiff after the second sound in the diastolic period, followed with an interval with no murmur, and then a harsh rumbling murmur running up to the first sound. There was no evidence of an aortic lesion, and the diastolic soft murmur before mentioned was only audible over the mitral area.

She was given saline purgatives, imperial drink, digitalis, and strophanthus. The urine increased in quantity, and the albumin fell on the third day to 5 per cent. (Esbach).

Labour pains set in four days after admission. The labour was terminated under chloroform by forceps. Slight bleeding was allowed to take place. There was no cardiac embarrassment. She made an un-

interrupted recovery. The albumin had completely disappeared from her urine.

Case 11.—*Mitral Stenosis and Incompetence—Induction of Abortion at the end of the Third Month.*—Mrs. C., a multipara, had suffered from heart disease for a number of years. She had had repeated attacks of breathlessness, palpitation, etc., and at her last full-time confinement had very nearly died. Dr. Carstairs Douglas, who had attended her, was of the opinion that she could not stand the strain of another labour, and he had induced an abortion at the third month about two years ago. Dr. Taylor, of Skelmorlie, sent her to me for induction of an abortion.

She was three months pregnant. Her heart was considerably dilated and irregular, and quick in its action. At the apex a presystolic and a systolic murmur was heard. Considering her past history, I agreed that an induction of an abortion was the best treatment.

The patient was prepared for the operation by the administration of a purgative. On the following day, after thoroughly cleansing the external genitals and douching the vagina with lysol solution, I passed a sterilized sound, and moved it about freely in the uterus. Two days later uterine action began. About mid-day the patient was seized with a very violent rigor, which lasted for fully five minutes. Her temperature rose to 105° F. and her pulse became so rapid that it could not be counted. I at once stimulated her freely, and gave her 10 grains of quinine. She had several very severe rigors in a short time, and then the uterus emptied itself. Everything came away, and seemed perfectly fresh. I gave an intra-uterine douche. The stimulation was continued, and, in addition, a large dose of calomel was administered. There were one or two rigors after the uterus was emptied, and the temperature remained at 105° F. until the bowels moved about four hours later. She passed a very large quantity of horribly offensive fæces. In a short time the temperature fell, and in twelve hours it was normal. It never rose again, and she made a good recovery. She has since died from heart disease.

The rigors and high temperature puzzled me at the time. I had taken every precaution against sepsis, but if she had died before the bowels moved I would never have been able to get rid of the feeling that in some way or other I had infected her.

It was clearly a case of auto-infection from the contents of the bowels. I have occasionally seen cases of this during the puerperium, but never such an alarming one. The purgative given before the operation had caused a motion, but had not cleared the bowels. The curious thing was that the patient denied that she had been specially constipated.

Case 12.—*Mitral and Tricuspid Incompetence—Labour at Full Time.*—J. F., aged 26, 2-para, was admitted to the Glasgow Maternity Hospital on February 6, 1901, in labour. As I was ill at the time, I did not see this patient; but as the case occurred during my term of duty in the hospital, I have included it.

Previous history: The patient had been in feeble health for some time past. She had had a bad attack of chorea in childhood, recurring attacks of rheumatism, and an attack of scarlet fever. She had suffered for many years from a weak heart. Her doctor had told her 'it was only a matter of time with her.' She had had a severe cough for a long time. Her previous labour had not apparently caused her much trouble.

State on admission: The os was nearly three-fourths dilated. The legs were œdematous. The breathing was rapid and laborious, and numerous râles were heard over the chest. At the apex of the heart a loud blowing systolic murmur was heard. The heart was beating forcibly and rapidly.

Two hours after admission the membranes ruptured. The breathlessness became greatly aggravated. Forceps were applied and a live child

easily delivered. Chloroform was not given. She was freely stimulated with whisky and hypodermic injections of strychnine and digitalin. Her breathlessness and distress rapidly increased, and she died five hours after delivery.

The post-mortem examination was performed by Dr. Carstairs Douglas. The pericardium contained a few ounces of fluid, and each pleural cavity also contained about 12 ounces of the same. The heart was large and somewhat fatty. The left auricle was dilated, and contained a firm adherent ante-mortem clot the size of a bantam's egg. The left ventricle was hypertrophied, and the mitral valve incompetent, with distinct sclerosis of the cusps. A slender ante-mortem clot extended into the aorta. The aortic valves were healthy. The right ventricle was a little dilated, and it and the right auricle contained ante-mortem clots. The tricuspid valve-ring was dilated. The lungs showed marked œdema, and the left one some brown induration. The liver was nutmeg.

Case 13.—*Mitral and Tricuspid Incompetence—Labour at Full Time.*—Mrs. McM., aged twenty-seven, 4-para, was sent into the Glasgow Maternity Hospital by Dr. Geo. Turner. There was extensive œdema of the legs and especially of the vulva. There was also some swelling of the face. Both lungs showed evidence of œdema at the bases behind. A soft systolic murmur was audible in the mitral area, and a sharper, higher-toned one in the tricuspid area, also systolic. The position of the apex-beat could not be made out, neither could the exact size of the heart be determined, as the lungs were evidently emphysematous. Bronchitic râles were heard all over the chest. The urine contained a trace of albumin.

The patient was markedly anæmic. She stated that she had been breathless for a considerable time, and that the legs had been swollen for a few weeks. The swelling of the vulva had only come on within the last few days. She considered that her labour was due in a few days. The labia were punctured and allowed to drain into sterilized dressings, and tincture of strophanthus, 10 minims, and ammonium carbonate, 5 grains, given every four hours.

She improved considerably, and four days later labour came on. The first stage lasted about four hours. At the end of it she began to show cardiac embarrassment. The pulse became weak and irregular. She was given a hypodermic injection of digitalin and strychnine. Chloroform was administered by Dr. Primrose, and Dr. McClure delivered her with forceps. The child was alive. The uterus relaxed, and a gush of blood was allowed to escape. The uterus was then firmly grasped and the placenta expelled. As the patient was very anæmic, it was not considered advisable to allow any more bleeding, so she was given a hypodermic of ergotin and a hot intra-uterine douche. Four hours after delivery the pulse was very feeble and began to run. One pint of normal saline solution was run into the tissues beneath the right breast. The pulse became stronger after this. Digitalin and strychnine injections were given every six hours, and 3 drachms of whisky every two hours. Twelve hours after delivery she had rallied sufficiently to be moved into the ward.

She did very well until the fifth day of the puerperium, when her temperature rose to 104·4° F. and her pulse to 140. She was given an intra-uterine douche, and digitalin and strychnine hypodermically. The temperature fell to 99·2° F. next day. After that it remained irregularly febrile, and her pulse at times was very feeble and quick. The anæmia seemed to be progressing, so as soon as her stomach would stand it she was given peptonated iron in addition to her cardiac tonic and stimulant. We also gave her a large saline injection into the abdominal wall. By the eighteenth day of the puerperium she was improving. The temperature was still slightly raised. In spite of all we could say or do the husband

insisted on taking her home. I saw her about ten days after she left the hospital. She was still very anæmic, but had improved somewhat, in spite of the fact that she was lying in a sunk apartment where artificial light was necessary in the middle of the day.

The febrile condition was undoubtedly due to sapræmia in part, but I think the anæmia also contributed towards it. She had very bad ulcerating piles, and I have no doubt that infection spread from them to the vagina. The condition bordered very closely on, if it was not actually one of, pernicious anæmia.

In pregnancy an extra amount of work has to be done by the heart to supply the wants of the uterus. When the heart is healthy Nature easily provides for this by a certain amount of hypertrophy, especially of the left ventricle, as it is on it principally that the extra strain falls. If the heart is diseased in a non-pregnant woman, as in a man, Nature tries to remedy matters by a compensatory hypertrophy, and the patient may go on fairly comfortably for years, so long as the compensation is sufficient. If, however, the woman becomes pregnant, the extra strain thrown on her circulation will be very liable to upset the arrangement, and failure of compensation and its attendant evils will follow.

The seriousness of this complication of pregnancy may be gauged from the very high death-rate given by most authorities. Something like 50 per cent. of the patients are said to die, but in my experience it has been very much less than this. If the patients are seen soon enough, and means taken to strengthen the heart for the strain of labour, and proper treatment adopted during labour, the vast majority of them should safely be carried through. Only one of my cases died, which is a very marked contrast to the result in the cases collected by Macdonald, viz., 17 deaths out of 31. His cases were more serious ones than mine, bnt still mine all possessed well-marked lesions, and some of them showed very grave indications.

Pure mitral stenosis is said to be the most deadly of all the lesions. The blood is dammed back into the lungs, which become engorged and œdematous, and finally the right side of the heart becomes dilated. With the completion of labour the uterine vessels are so far cut out of the circulation, and if there has not been a free hæmorrhage during the third stage of labour, a large amount of blood must necessarily be returned to the right side of the heart, which may become engorged and paralyzed. A case published by Berry Hart showed this very distinctly. The woman died suddenly shortly after delivery, and the right side of the heart was found to be enormously dilated and full of blood (see Fig. 1). Hart argues that in such cases free bleeding should be encouraged to prevent this over-distension of the right side of the heart, and if there is no bleeding

from the uterus, one should open a vein in the arm if any cardiac embarrassment manifests itself. I entirely agree with his views, and always try to get a free flow of blood during the third stage. In Case 6 (mitral stenosis), before the first stage was completed cardiac embarrassment began to manifest itself, but she bled very profusely during the third stage, and there was no engorgement of the right side of the heart.

Next in seriousness to mitral stenosis comes aortic incompetence. Mitral incompetence is not so serious unless it is very marked. If the regurgitation is not very serious the patient may show no embarrassment during labour. In more than one instance we have discovered mitral regurgitation in patients after delivery where there was nothing

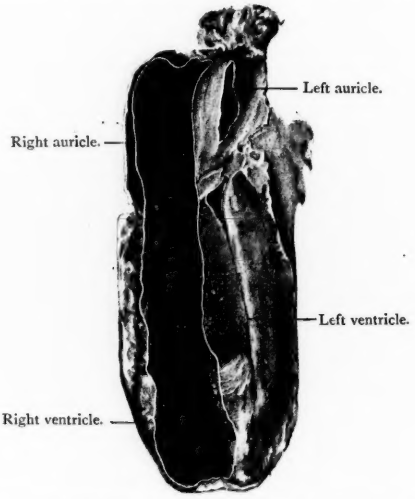


FIG. 1.—SECTION OF HEART WITH MITRAL STENOSIS IN CASE OF SUDDEN DEATH AT END OF LABOUR (HART).

noticed at the labour, and I have one patient in private who has developed a fair amount of incompetence, but does not seem to suffer any inconvenience. She has had two children since the cardiac mischief developed.

As a rule, bad symptoms do not begin to manifest themselves until after the mid-term of pregnancy. It is then, of course, that the extra strain begins to tell upon the heart. Breathlessness, palpitation, cough, and œdema will be present in varying degrees. Albumin will often appear in the urine. The patient will probably not be able to lie down.

Heart Disease and Marriage.—If a woman has heart disease should she marry? How are we to answer such a question?

If the woman has suffered from failure of compensation at any time, no matter what the lesion is, or if the lesion is mitral stenosis, aortic incompetence, or incompetence and stenosis combined, the answer should be decidedly negative. The advice will probably not be followed, but, all the same, it should be given.

Treatment.—Our efforts must be directed towards assisting Nature to repair the mischief. The patient must be kept at perfect rest, and every effort must be made to strengthen and relieve the heart. The bowels must be kept clear, the kidneys stimulated, the lungs relieved, and, above all, cardiac tonics must be freely administered. Strophanthus is a pure cardiac tonic, and it is for that reason, probably, more useful than digitalis. In a very short time there will very likely be a considerable amelioration of the condition, but the cardiac tonic must be continued.

If the patient is not relieved, the question of induction of premature labour arises. In bad cases premature labour is apt to occur of itself, as in Cases 1 and 3. The results from induction are so bad that I am inclined to question the propriety of doing the operation. The risk is exceedingly great. In a bad case I should advise the induction of abortion before the fourth month—*i.e.*, before the extra strain has begun to tell on the heart—but in the later months I should be very loath to interfere.

When labour begins a large dose of strophanthus or digitalis should be given. As soon as the os is fully dilated the labour should be terminated. The patient should never be allowed to bear down. If cardiac embarrassment begins to manifest itself before the os is fully dilated, dilatation and delivery should be effected at once. If the cervix is rigid, it should be incised. These patients take chloroform quite well, and it should be always used in bad cases. During the third stage the uterus should be allowed to relax, and bleeding should be encouraged. Ergot is therefore contra-indicated, unless in exceptional cases, such as Case 13, and then it was only given after there had been a free flow of blood to begin with. If the patient should show marked cardiac embarrassment, and very little blood be lost post-partum, I would have no hesitation in opening a vein in her arm. During the puerperium the cardiac tonic must be continued along with free stimulation. As a rule, if the patient passes safely through the strain of labour, all will go well, but occasionally acute œdema of the lungs and cardiac failure supervene a few days later. Nursing should be prohibited, as lactation has been found to have a bad effect upon the damaged heart.

I am indebted to my various residents for their careful reports of the cases.

SARCOMA OF THE VAGINA.

By W. ROGER WILLIAMS, F.R.C.S.

Of the organs evolved from the different segments of the Müllerian ducts, only the uterus manifests great proclivity to tumour formation, for the vagina and Fallopian tubes are seldom affected. Thus, of 9,648 consecutive tumours in women tabulated by me, 2,648 were of uterine origin (cancer 1,571, sarcoma 2, myoma 1,073, and cystoma 2); whereas only 54 arose from the vagina (cancer 40, sarcoma 2, myoma 3, and cystoma 9). From this it may be inferred that the biological peculiarities which determine a given part to tumour formation, depend more upon functional than upon genetic considerations. The vagina, for instance, is physiologically more akin to the vulva than to the uterus, and the results of this similarity are apparent in its pathological neoplastic variations. Although sarcoma of the vagina is so much rarer than cancer, yet the number of cases on record is considerable. A special feature of the malady in this locality, is the large number of cases that originate in infancy, many of them being congenital. It is also met with in adults, but less frequently. Of 27 primary vaginal sarcomata tabulated by Gatti, 17 were in infants, and only 7 in adults; and I think these numbers fairly represent the relative frequency of the two types of the disease.

(*a*) The Infantile Type.

Sarcomata of this kind present special features, besides their early occurrence; thus, they are often multiple *ab initio*, and other organs besides the vagina may be concurrently affected—such as the vulva, uterus, bladder, urethra, and even the rectum. These tumours often contain various unusual structures—to wit, striped muscle elements, islets of epithelial cells, leiomyomatous tissue, and telangiectasic bloodvessels, and they are relatively often congenital. These various indications point to their origin from developmental irregularities. It will be remembered that the vagina is formed by the coalescence of two pairs of tubes, which are at first separate; and it is exceedingly probable that during the process of approximation and fusion, fragments of matrix detached from adjacent parts, become included in the developing organ. It is from dislocated cells connected with aberrant sequestrations of this kind that these peculiar tumours probably arise. Heckford* has reported an instance concomitant

* *Trans. Obstet. Soc. Lond.*, vol. x., 1869, p. 224.

with gross vaginal malformation, in which a large vaginal pouch—situated between the rectum and the uterus—was filled with the peculiar polypoid vegetations characteristic of this form of sarcoma.

It will be noted that, of the other structures apt to originate this type of sarcoma, all are more or less involved in the complicated developmental processes concerned in the formation of the cloaca; indeed, it is with the evolution of this structure—even more than with that of the vagina proper—that this curious disease appears to be associated.

Growths of this kind are commonest in early infancy, very few cases being met with after the fifth year. Of the 40 cases in my list, 36 belong to this period. The age distribution of these cases was as follows:

	Cases.
Congenital	6
1st to 6th month	2
6th month to 1st year	6
1 year to 1½ years	9
1½ to 2 years...	3
2 to 2½ years	2
2½ to 3 years	3
3 to 4 years	2
4 to 5 years	3
5 to 6 years	1
6 to 7 years	1
8 to 9 years	1
14 to 15 years	1

The general features of the disease in a typical case are well illustrated by a specimen preserved in the museum of St. Bartholomew's Hospital, which is thus described in the catalogue:*

'A large cluster of polypoid growths removed from the walls of the vagina and from the nymphæ of a child. They were of various sizes and shapes; the largest, about 3 inches in diameter, was attached to the upper wall of the vagina. They were soft and whitish, some being gelatinoid and almost pellucid. Histological examination revealed fibro-cellular connective tissue.'

The history of the patient was as follows: At birth a growth, 'like a bunch of small grapes,' was observed projecting from the vagina, to the right wall of which it appeared to be attached. It was ligatured and cut off when the child was only six weeks old. There was recurrence, but no further operation was done until the

* Vol. iii., 1862, p. 156.

child was three years old, when the mass was again ligatured and cut off. This time recurrence was very rapid, for the tumours above described were removed only six weeks after the second operation. It was then recognised that the whole of the disease could not be extirpated, especially in the vicinity of the urethra. The growths rapidly increased, and the child died of asthenia three months later.

This type of sarcoma generally presents clinically as a polypoid, quasi-papillary, or lobulated mass, projecting from the vulva. Further examination reveals the greatly distended and elongated vagina filled with vegetations of this kind. Connected with some part of the vaginal wall, a firm, solid mass of new growth—the main tumour—may generally be found, which may be sessile or pedunculated. It consists of sarcomatous substance, in which round cells usually predominate, together with a considerable amount of fibrous tissue. Sometimes several tumours of this kind are met with. The rest of the vaginal wall is much thickened and infiltrated with myxo-sarcomatous tissue, its surface being studded with innumerable small polypoid outgrowths of soft, pellucid, grayish or pinkish aspect, which in appearance much resemble the ordinary nasal polypi. Histologically examined, these vegetations consist of œdematous myxo-sarcomatous substance, covered with stratified vaginal epithelium. Where they project externally they may become eroded, but they seldom ulcerate. Being very vascular, they are apt to bleed when handled, and they are easily detachable. Growths of this kind have often been mistaken for ordinary mucosal polypi, as in cases reported by Billroth, Marsh and others.

Quite exceptionally one or more pedunculated sarcomatous tumours may be met with in the vagina, without the usual concomitant diffuse polyposis. These vaginal sarcomata often appear clinically to be much more innocent than they really are, for, as a rule, they recur rapidly after removal, and occasionally manifest other signs of malignancy.

Lymph-gland dissemination is rare, for there were only three instances of it in the forty cases comprising my list (Sänger, Ahlfeld, and Demme). In these cases the adnexa, broad ligaments, ovaries, etc., were also invaded; but there was not a single instance of metastasis in internal organs. Probably, however, this form of dissemination does sometimes occur, for in a case of this type of disease affecting the vulva, as reported by Chauveau,* metastases were met with.

* *Thèse de Paris*, 1895.

His patient was five years old when the vulvar growths were first extirpated. There was recurrence six weeks later, and within a short time two further recurrences were removed; but the disease soon returned and caused death. The whole vulva was covered with polypoid formations. The main tumour was fibro-spindle-celled sarcoma, with islets of epithelial cells embedded in the tumour substance. There were secondary growths in the pelvic and mesenteric glands, as well as in the liver and kidneys.

Although the disease is first noticed at birth in only a comparatively small proportion of the total cases, it seems probable that most of these early-life vaginal sarcomata are of congenital origin. It follows from this that the malady generally runs a somewhat chronic course; but, when recurrence has once ensued, the case proceeds rapidly to a fatal termination. Adjacent parts, such as the bladder, urethra, and peritoneum, are apt to be invaded, causing fatal complications. Hydronephrosis is only occasionally met with, but acute congestion of the kidneys and uræmia are of frequent occurrence. In a few cases the disease appears to have been cured by early and thorough operation. The only operative treatment of any avail is total extirpation of the vagina, together with the uterus, ovaries, and adnexa, by abdominal section.

ILLUSTRATIVE CASES.

The futility of partial operations, and other interesting details, may be gathered from the subjoined abstracts of some of the more important cases:

Case 1.—A child, two and a half years old, who when first seen—one year previously—had suffered for several months from a watery vaginal discharge, which was at times blood-stained, came under Lea's* care. On examination he found the vulva studded with soft polypi, and masses of firm growth about the introitus vaginæ and the peri-urethral region. There was a median, pyriform, abdominal tumour, which felt elastic and extended from the pelvis to the umbilicus. The patient being anæsthetized, it was found that the abdominal tumour consisted of the enormously distended and elongated vagina, which was filled with softish polypoid masses. At the top of this tumour was a small firm body, which appeared to be the uterus. The recto-vaginal septum and the base of the bladder were involved by the disease. With a curette as much as possible of the morbid mass was removed. Death ensued soon afterwards. There was no necropsy. Histological examination of the fragments removed showed that the growth was round-celled myxo-sarcoma. The tumour substance was pervaded by numerous large, thin-walled bloodvessels.

Case 2.—In a case reported by Holländer,† the patient was only seven months old when the disease was first noticed. It soon recurred after local ablation. On examination two months later, a sarcomatous

* *Trans. Obstet. Soc. Lond.*, xlii., 1901, p. 143.

† *Zeitsch. für Geburts. und Gynäk.*, 1896, S. 125.

outgrowth was found projecting from the portio and the adjacent part of the vagina. The utero-vaginal mucosa was thickly studded with polypoid excrescences. The uterus and vagina, together with the whole diseased area, were extirpated by the sacral route. The child recovered from the operation. The growth removed was a round- and spindle-celled, fibro-sarcoma, identical in structure with the primary sarcomatous polyp.

Case 3.—In Hauser's* case, a racemose polypoid sarcomatous growth protruded from the vulva when the child was six months old. Symptoms dated from the sixth week. The growth recurred rapidly after local ablation, and the child died eighteen months later. The main tumour was connected with the anterior vaginal wall. Histologically examined it consisted of round- and spindle-celled, somewhat alveolated, sarcomatous structure containing numerous large, thin-walled bloodvessels. In the sarcomatous matrix areas of transversely striped spindle cells and muscle fibres were met with, as well as leiomyomatous cells and islets of epidermoidal cells, including well-marked 'nests.'

Case 4.—In a cachetic infant two and a quarter years old, who died of exhaustion, Pick† found the vagina, cervix, and uterus studded with lobulated masses of sarcomatous growth. The parametrium was also invaded, and there was pyometra. The symptoms were of nine months' duration. Histologically examined the tumour proved to be spindle-celled and myeloid sarcoma.

Case 5.—Ahlfeld's‡ patient was three years and four months old, when she died of this malady, without having undergone any operative treatment. The vulva, vagina, and uterus were affected. The disease had also invaded the base of the bladder, the inguinal glands, and the uterine adnexa. The main tumour was of fibro-sarcomatous structure.

Case 6.—One of the best-recorded British cases is D'Arcy Power's.§ His patient—two years and four months old—came under treatment for retention of urine caused by vaginal growths of this kind. The symptoms were of fourteen months' duration, beginning with purulent vaginal discharge after an attack of measles. On several occasions masses of polypoid growths, which projected from the vagina, had been removed with the curette, but others soon formed. Shortly before Power saw her, she was suddenly taken with severe abdominal pain, retching, and retention of urine, and attempts at catheterization had failed. There was a large, pyriform median, intra-abdominal tumour, which extended upwards from the pelvis to midway between the navel and the xiphoid. This appeared to be the distended bladder. There was puriform vaginal discharge. The introitus vaginæ was blocked by a mass of exuberant grayish outgrowths, resembling œdematous granulations, which readily bled when touched. Digital examination showed that the main sarcomatous tumour consisted of bossed outgrowths, growing from the posterior wall and right side of the vagina, the area of implantation being of much firmer substance than the projecting part. The vagina was greatly dilated and elongated, owing to its distension by the contained growths. The os uteri could be felt only with difficulty. Rectal examination showed that the recto-vaginal septum was infiltrated, and the bowel compressed against the sacrum by the tumour mass. After evacuating the bladder by suprapubic puncture, a pear-shaped intra-abdominal tumour, reaching as high as the navel, still remained. Death took place the next day with uræmic symptoms. At the necropsy the greatly distended and thickened bladder was found to fill nearly the whole of the peritoneal cavity. It was unaffected by the

* *Archiv. für path. Anat.*, Bd. lxxxviii., 1882, S. 165.

† *Archiv. für Gynäk.*, Bd. xlvi., Heft 2, 1894, S. 191.

‡ *Archiv. für Gynäk.*, Bd. xvi., 1876, S. 135.

§ *St. Bartholomew's Hospital Reports*, vol. xxxi., 1895, p. 121.

disease, but the outflow of urine had been obstructed by the projection of the tumour mass in the vagina. The urethra was elongated, but otherwise free from disease. The kidneys were congested, and there was no hydronephrosis. The vagina was greatly distended and elongated. Its walls were thickened and its mucosa congested. The main tumour presented as a lobulated mass, 'like the wattles on a cock's comb.' The rest of the vaginal mucosa was studded throughout, with an immense number of soft, gelatinous polypi, varying in size from a pin's head to a large pea, being most abundant at the upper and lower ends of the vagina. None of the new growths were ulcerated. The uterus and adnexa were congested, but free from the growth. The adjacent lymph glands were also unaffected, and there were no secondary growths in other parts of the body. Histological examination of the thickened vaginal wall showed that it was infiltrated with small, round-celled, and myxomatous new-formation. The polypi consisted of vascular myxo-sarcomatous structure, covered by the vaginal epithelium. The main tumour was a small round-celled fibro-sarcoma.

Case 7.—In Marsh's* case the child came under treatment, when two years old, with the following history. One year previously her mother noticed 'a pale fleshy substance' projecting from the vulva, which rapidly increased. It was ligatured and left to slough off, but a fresh growth soon formed. Some half-dozen operations of this kind, with the like result, were afterwards done at short intervals. Then incontinence of urine supervened, together with pain, hæmaturia, and offensive discharge, and the child emaciated. On examination under anæsthesia, Marsh found just within the vulva, a large mass of polypoid, grape-like outgrowths; others projected from the urethra, and it was ascertained that the attachment of some of these was within the bladder. The urethra was so distended by these growths, that it was at first mistaken for the vagina. Some outgrowths were as large as grapes, others were quite small. On combined rectal and abdominal palpation a solid mass, the size of a hen's egg, was felt in connection with the posterior wall of the bladder. Death occurred shortly afterwards, without any further operative treatment having been undertaken—sixteen months after the first detection of the malady. At the necropsy a firm, solid mass of new-growth was found in the vesico-vaginal septum, which projected into the bladder and into the vagina, and both its surfaces were covered with multiple polypoid outgrowths. The bladder polypi were limited to its base and neck, and those of the vagina were confined to its anterior wall. The uterine mucosa also presented some similar formations. The main tumour was of fibro-spindle-celled structure, and very vascular; it also included leiomyomatous tracts. The smaller polypi consisted of a fibro-cellular core, lined externally by stratified vaginal epithelium. There were no secondary deposits, and all the other organs were healthy.

Case 8.—Kolisko† has described a similar case to Marsh's. The patient was eighteen months old, and the symptoms were of two months' duration, the child's mother having noticed a tumour projecting from the vulva soon after their onset. The little patient was brought to Billroth's clinic, having been seriously ill for only a fortnight. The tumour was removed, and the vaginal polypi were curetted. There was recurrence a few weeks later, with retention of urine and peritonitis, of which the child died. The post-mortem examination revealed a dense fibro-sarcomatous tumour of the vesico-vaginal septum, while the mucosæ of the vagina, cervix uteri, and bladder, were thickly studded with polypoid formations.

Case 9.—In Demme's‡ case, although the patient was five and a half

* *Trans. Path. Soc. Lond.*, vol. xxi., 1874, p. 178.

† *Wiener klin. Woch.*, 1889, Nos. 6-11.

‡ Cited by Kolisko, *Op. cit.*

years old when she first applied for surgical treatment, a tumour was noticed at the vulva soon after the child's birth. On examination, Demme found a polypoid mass at the vaginal orifice, and a tumour springing from the right side of the vagina at its upper part. These growths were freely removed, but they recurred five months later. Numerous other operations of this kind were done every few months, until the child's death, one and a half years after the first operation. The post-mortem examination revealed extensive local recurrence, and besides this there were secondary outbreaks in the inguinal, pelvic, and retroperitoneal lymph glands, as well as in the bladder and ovary. The primary tumour was a fibro-sarcoma.

Case 10.—Sänger,* in a child two years and eight months old, found a polypoid sarcomatous tumour growing from the anterior columna rugarum, which was surrounded by multiple polypoid outgrowths, and similar formations had also invaded the vulva. The inguinal glands were enlarged. A few months later the disease was freely removed, but it soon recurred, and the child died thus of peritonitis when three and a half years old. The bladder and urethra were infiltrated, the former organ being enormously dilated and thickened. There was double hydronephrosis, and the kidneys were anæmic and fatty. There were signs of general dropsy. A sarcomatous pelvic lymph gland had compressed the left iliac vein, so as to impede the circulation through it. There were secondary growths in the pelvic and lumbar lymph glands, and in both broad ligaments. The primary tumour was a round- and spindle-celled fibro-sarcoma—'sarcoma medullare nodosum et polyposum.'

Appendix on Vaginal Polypoid Formations in Infants.

Several instances of congenital and early-life polypoid formations in the vagina have been met with, and these are often erroneously referred to as examples of congenital 'myoma.'

In Martin's case† a 'fibröser Scheidenpolyp,' which was visible at birth, was removed by ligature, and the patient cured.

Traetzl‡ found a 'fibromatöser Polyp,' growing near the uterus from the posterior vaginal wall, in an infant one year and three months old. It was freely removed and the child cured.

With regard to the occurrence of mucous polypi in the vagina, De Sinéty says: 'Plusieurs gynécologists admittent l'existence dans le vagin, de polypes muqueux. Ces productions, si elles existent, sont en tout cas trés rare, et en l'absence d'examen histologique nous n'avons aucune notion sur leur structure.' Since then Ivor Thomas§ has reported an instance which seems to come under this heading. A lady consulted him on account of her daughter, one year and nine months old, who had 'something showing from her privates.' On examination a soft, friable, reddish tumour was found protruding from the vagina. It was eroded, and had caused dysuria. Under

* *Archiv. für Gynäk.*, Bd. xvi., S. 58.
† *Zeitsch. für Geburts. und Gynäk.*, Bd. iii., 1878, S. 406.
‡ *Allg. Wiener med. Ztg.*, Bd. viii., 1863, S. 238.
§ *British Medical Journal*, vol. ii., 1897, p. 1088.

anæsthesia a 'grape-like,' stalked tumour, the size of a walnut, was found distending the vagina, being attached to its anterior wall high up. This tumour was successfully removed, and on histological examination it proved to be of a myxomatous nature.

Chiari* has reported an instance in which he found a congenital myxo-fibromatous polypus in the vagina of a still-born child. Schmidt† in a child one year old, and Pfaff‡ in a child two years old, have also met with these soft polypi.

Wilson§ found a large polypoid vaginal tumour in a child two and a half years old. The symptoms were of nine months' duration. The day before the child was first seen she experienced pain and difficulty in micturition, and her mother found a large red mass hanging from the vulva. Examination showed a lobulated, reddish, fleshy-looking tumour, the size of a small orange, protruding from the vagina, to the posterior wall of which it was connected by a broad pedicle. The tumour had no connection with the bladder or rectum. Under anæsthesia the pedicle was ligatured and the tumour was cut away. The patient was soon convalescent. Histological examination showed that the tumour 'resembled in structure a mucous polypus.' This case is erroneously cited in many works, as an example of infantile 'myoma uteri.'

Sometimes these polypoid formations are of a very vascular nature, as in a case reported by Waldstein.‖ The patient was eighteen months old, and had been subject to intermittent vaginal hæmorrhage for five months. This was found to proceed from a tumour, the size of a cherry, which was attached to the lower third of the posterior vaginal wall by a broad pedicle. It was freely extirpated, together with the parts adjacent to the area of implantation. Histologically examined it proved to be 'hæmangio-sarcoma peritheliale.'

As the foregoing case shows, these infantile polypi are not always of an innocent nature. Witebsky¶ has met with an instance, in a child six years old, in which a tumour of this kind, which on microscopical examination appeared to be a simple mucous polypus, was nevertheless recurrent for the third time after extirpation.

It appears that polypoid outgrowths sometimes arise in connec-

* *Jahrb. für Kinderheilk.*, Bd. xiv., S. 230.
† Cited by Ahlfeld, *Archiv. für Gynäk.*, xvi., 1880, 139.
‡ Cited by Beigel, *Krank. d. weibl. Geschlechts.*, ii., 1876, 423.
§ *Medical Times and Gazette*, vol. i., 1876, p. 360.
‖ *Monats. für Geburts. und Gynäk.*, May, 1899.
¶ *Monats. für Geburts. und Gynäk.*, May, 1899.

tion with the columnæ rugarum. De Sinéty* has described a case of this kind, in which a pinkish, fleshy structure, resembling a small penis, projected from the vulva. This was found to consist of the great hypertrophied anterior median mucous fold. This condition was first noticed in early infancy.

(*b*) The Adult Type.

This form of the disease presents much the same general features as sarcoma in other hollow organs, such as the uterus. Mucosal and parietal varieties may be recognised, according to the seat of origin of the primary tumour. The mucosal variety is much the rarer. It presents as a mass of softish, bossed outgrowths, projecting from the infiltrated mucosa; or as a solitary circumscribed tumour, which may be pedunculated or sessile. In the parietal variety a well-defined, firm tumour—varying in size from a walnut to an apple—is usually met with; but exceptionally the disease presents as a dense nodular infiltration.

Such growths may become inflamed and sloughy; but it is only exceptionally that they ulcerate. The infiltrated forms are the most prone to be thus affected, and in their clinical aspect they then much resemble cancer. In consequence of septic processes thus arising, such complications as endometritis, salpingitis, pyometra, pyosalpinx, and peritonitis, are apt to ensue. Besides the primary tumour, secondary nodules may sometimes be found in the vaginal wall, vulva, etc., as in cases reported by Schwarz, Morris, Spiegelberg, Steinthal, etc.

Mucosal sarcomata are generally soft and vascular—small, round, and spindle cells predominating in their structure, which often comprises considerable myxomatous areas. In many cases of this kind the vascular development is so pronounced as to merit the special designation of 'angio-sarcoma,' of which instances have been reported by Seitz ('lymphendotheliom'), Schwarz, Klein ('lymphangioendothelioma,' etc.), Alglave, and Kalustow. Gebhard has also described a case of vaginal-'endotheliom' in a girl only fourteen years old. Severe hæmorrhages are common with this type of the disease.

The parietal tumours are generally mixed-celled fibro-sarcomata, in which spindle cells predominate. Large round-celled and myeloid forms have also exceptionally been met with, as well as specimens containing an appreciable quantity of leiomyomatous elements. It seems probable that some sarcomata of this kind may

* *Revue de Gyn. et de Chir. Abd.*, Mars-Avril, 1899.

originate from vaginal 'fibroids,' as in a case reported by Homs. Parietal sarcomata present as firm, circumscribed tumours, which may easily be confounded with fibromata, myomata, and cystomata of the part.

The great majority of these sarcomata in adults, originate from the lower part of the vagina, not far from the introitus; this was the condition in fourteen out of sixteen cases in my list, in which information of this kind was available. Quite as many of these tumours originate anteriorly as posteriorly. As the disease progresses it often involves adjacent structures, such as the vulva, peri-urethral region, bladder, pelvic connective tissue, rectum, etc., but it seldom spreads to the uterus. The pelvic and inguinal lymph glands may be secondarily involved, as in three of the eighteen cases in my list; and several instances of its dissemination in distant parts (lungs, pleura, skin of chest, abdomen, etc.) have been reported (Spiegelberg, Bajardi, Herzfeld, etc.).

The disease generally recurs rapidly after local ablation, but the following exceptions to this rule have been reported:

1. During the accouchement of a multipara, Spiegelberg* noticed a circumscribed tumour—the size of a walnut—in the lower part of the anterior vaginal wall. This was subsequently thoroughly removed, and histologically examined it proved to be a spindle-celled fibro-sarcoma. When the patient was last heard of—four years later—she was well and free from any sign of recurrence.

2. In a recently-married woman, twenty years old, who proved to be about six months pregnant, C. A. Morris† found a firm, nodular, sessile mass of eroded new-growth blocking the introitus and invading the adjacent parts of the vagina and vulva on the right side. The rectum, uterus, and bladder were unaffected. A fragment of the morbid mass—removed for microscopical examination—exhibited the structure of round- and spindle-celled fibro-sarcoma. The whole diseased area was therefore freely removed, without waiting for delivery. She recovered from the operation, and in due course was safely delivered of a healthy child. When last heard of—two and a half years after the operation—she was in good health and free from any return of the disease.

3. In a multipara, aged thirty-nine, who three months previously noticed a lump at the vaginal orifice, Menzel‡ found on examination, a tumour the size of an apple, attached to the lower part of the

* *Archiv. für Gynäk.*, Bd. iv., 1872, S. 348.
† *Practitioner*, vol. ii., 1898, p. 593.
‡ *Cent. für Gynäk.*, 1885.

anterior vaginal wall. This was removed by a local operation, and proved on microscopical examination to be a round- and spindle-celled sarcoma. When last heard of—ten months after the operation—there was no return of the disease, and she was then seven months pregnant.

The disease generally runs a rapid course, for the average duration of life of the fatal cases in my list—dating from the first noticeable symptoms—was only 10·7 months, the longest duration 24 months, and the shortest 1½ months. In three of the above cases the fatal issue occurred shortly after local removal of the disease, the causes of death in these cases being erysipelas, hæmorrhage, and pulmonary embolism respectively.

This type of vaginal sarcoma is often concomitant with pregnancy, and this was so in no less than five of the cases in my list. In none of these cases was the progress of the disease accelerated or otherwise unfavourably modified on this account; indeed, of the three successful local operations, as above described, in two the disease was concomitant with pregnancy.

The average age of the patients at the onset of the disease was thirty-two years, the youngest being fifteen and the oldest fifty-nine years. In sixteen cases the age at onset was as follows:

15	to 20	years	...	...	...	4 cases.
20	,, 30	,,	...	...	...	4 ,,
30	,, 40	,,	...	...	...	4 ,,
40	,, 50	,,	...	...	...	1 case.
50	,, 60	,,	...	...	...	3 cases.

All of these women—save two—were married, and of these only one had never been pregnant—the others were multipara.

In the great majority of the cases, the initial indication of the disease was the discovery of 'a lump' at or near the vaginal orifice; in a smaller number hæmorrhage was the initial symptom; and in a still smaller number discharge, dysuria, painful micturition, etc. Pain was seldom complained of in the early stage. The local affections most likely to be confounded with the adult type of sarcoma are cancer, 'fibroids' (especially when inflamed), cysts, and certain syphilides.

The disease generally recurs rapidly after local ablation; hence early radical removal of the whole diseased area is the treatment indicated, whenever this seems feasible, and the general condition of the patient is otherwise satisfactory. When the disease is limited to the lower part of the vagina, vaginal extirpation by Olshausen's

method (transverse perineotomy, etc.) may suffice; but in other cases abdominal utero-vaginal extirpation—as for cancer—is preferable.

In the event of radical treatment being impracticable, relief may often be afforded by destroying as much of the disease as possible with the actual cautery. In other respects the treatment is the same as for uterine cancer.

Some of these vaginal sarcomata present features of special interest.

1. Thus, in Kaschewarowa-Rudnewa's* case striped spindle cells and muscle fibres were found embedded in the substance of the tumour, which was a spindle-celled myxo-sarcoma. These heterotopic elements were probably the result of some embryonic developmental irregularity connected with the evolution of the Wolffian duct. The patient was a girl of fifteen, in whom the catamenia had not appeared. The disease presented as a small polypoid tumour, which was attached to the lower part of the anterior vaginal wall. The uterus was normal. The tumour was removed, but it soon recurred, and increased so rapidly that in a few months' time, it attained the size of the head of a fœtus at term, and caused the girl's death.

In a spindle-celled sarcoma of the portio vaginalis, removed from a girl seventeen years old, Wirtz found similar rhabdo-myomatous elements.

2. Lindfors† has reported a remarkable instance of so-called 'deciduoma malignum' ('syncytioma') of the vagina, in which the tumour was successfully removed by operation, the uterus being uninvolved. The patient was a married woman, aged twenty-two, who three months previously had a premature confinement. She died seven months after the operation with pulmonary symptoms, there being no obvious signs of recurrence. At the necropsy, the left lung and the adjacent structures, the right lung, the spleen, liver, kidneys, brain, and intestines were found to be extensively invaded by malignant disease, having the characters of 'deciduoma malignum.' The vagina was quite free from any return of the disease; the uterus, ovaries, and tubes were healthy. If we accept the author's estimate of this case, 'deciduoma malignum,' with metastases, may occur without any involvement of the endometrium, as the result of dissemination from the fœtal membranes.

3. Steinthal's‡ case of vaginal 'angio-sarcoma' may belong to the same category, for the affection developed four months after the

* *Archiv. für path. Anat.*, Bd. liv., 1872, S. 63.

† *Cent. für Gynäk.*, No. 21, 1901, S. 557.

‡ *Archiv. für path. Anat.*, Bd. iii.

expulsion of a 'hydatidiform mole,' and there were two separate vaginal tumours. The disease progressed rapidly to a fatal termination. There was no necropsy.

4. Two other cases of this kind have lately been published by Schmit.* His first patient, aged thirty-six, one year and three months after having expelled a hydatidiform mole, developed two nodules in the vaginal wall, which on microscopical examination presented the appearance of 'syncytioma malignum.' As the uterus seemed healthy, these vaginal tumours were simply excised. Eighteen months later she was in good health, and free from any return of the disease. Schmit's second patient, forty-one years old, had aborted at the seventh week on November 30, 1900. The following January she had several severe floodings, which could only be arrested by plugging the vagina. After the last of these, a nodule was noted in the anterior vaginal wall, the uterus being normal. It was excised, and the uterus was curetted. The vaginal tumour was soft, non-encapsuled, and appeared to consist chiefly of coagulated blood. Histologically examined, it was found to consist of chorionic villi undergoing 'hydatidiform degeneration,' lying free in thrombi. In connection with these structures, actively proliferating cells of Langerhans' layer and syncytial masses were noticeable. The thrombi were surrounded by a zone of small round-celled infiltration. Eight months after the operation the patient still remained in good health. The author believes that in these cases the primary chorionic affection was non-malignant, and that it gave rise to metastases during parturition which were also non-malignant. He believes, however, that grafts of this kind are liable, after a time, to acquire malignant properties in their new habitat.

5. Pick† has also described a similar case in which the vaginal tumour was successfully excised, and the patient was still free from any return of the disease three and a half years after the operation.

6. Several other interesting cases of this kind by Schlagenhaufa, Schmorl, Wehle, etc., are referred to by Inglis and Bruce‡ in their valuable essay on 'Deciduoma Malignum.'

Any form of primary melanotic tumour of the vagina is of the greatest rarity, but the two following cases of melano-sarcoma in this situation have been reported:

(*a*) Horn's§ patient was a multipara, aged forty-nine, who two

* *Wiener klin. Woch.*, October 31, 1901.
† *Monats. für Geburts. und Gynäk.*, October, 1897.
‡ *Trans. Edin. Obstet. Soc.*, vol. xxvi., 1901, p. 119.
§ *Monats. für Geburts. und Gynäk.*, November, 1896.

and three-quarter years previously became subject to a fœtid sanious vaginal discharge. Soon afterwards she noticed a tumour projecting from the vulva. Four and a half months later this tumour was extirpated, and some enlarged glands were dissected out from the right inguinal region. The mucosa covering the extirpated neoplasm was found to be pigmented, although the tumour itself, which proved to be sarcomatous, was devoid of pigment. One very large and soft sarcomatous gland contained much pigment. One year later, there was recurrence in the vagina, and in the left inguinal region. The vaginal disease was freely destroyed by the thermocautery, and a mass of sarcomatous glands was removed from the left groin. Many of these were pigmented. Subsequently recurrent disease of the labia and right groin was extirpated. A large intra-abdominal extension of the disease then appeared, which infiltrated the parietes and extended into the pelvis. The patient died thus about three years after the onset of the primary disease.

(*b*) In Parona's* case, a spindle-celled melano-sarcoma invaded the vesico-vaginal septum. It was freely extirpated, together with part of the bladder, with some temporary relief.

In conclusion, it may be mentioned that sarcomatous disease of the vagina may be secondary to a primary focus elsewhere—*e.g.*, in the uterus, vulva, ovary, bladder, etc. Mucosal uterine sarcomata and 'deciduoma malignum' are specially prone to disseminate in the vagina.

ADDITIONAL BIBLIOGRAPHICAL INDICATIONS.

GOW : *St. Bartholomew's Hospital Reports*, vol. xxvii., 1891, p. 97.
SÄNGER : *Wien. klin. Woch.*, 1880.
SEITZ : *Samml. klin. Vorträge*, 1900, S. 280.
VEIT : *Handbuch der Gynäkologie*, Bd. i., 1897.

* *Ann. Univ. Med.-Chir.*, Milano, 1887, p. 241.

BLOOD-COUNTS IN THE NEW-BORN.

By JOHN AITKEN, M.D. (Glasg.), Kilmarnock, N.B.,
Late House-Surgeon, Maternity Hospital, Glasgow.

The following paper is based upon the results of a series of examinations of the blood of the new-born, carried out in the Glasgow Maternity Hospital in 1900-01. About 300 counts of the red and white corpuscles were made in forty-three different infants, and about 100 stained films were differentiated. The references to the weight of the child are the conclusions come to from 200 weighings.

The literature of the subject is scant, and mainly in German. There is an outline in the chapter on the 'Blood in Infancy' in Rotch's 'Pædiatrics,' 1896, mainly a review of the Continental writings, and a similar article in Cabot's 'Clinical Examination of the Blood,' 1900. A paper by Elder and Hutchison in the *Transactions of the Edinburgh Obstetric Society*, 1894-95, is the only record of original work in English that I have been able to find.

The blood of the new-born infant is richer in *red corpuscles* than that of the adult. The figures given by different observers vary greatly, and this is to be accounted for by the fact that the number per cubic millimetre increases for a time after birth, and that the observations were made at different periods.

Hayem,[1] in seventeen different infants *at birth*, found the average count to be 5,368,000 per cubic millimetre, and Cadet (quoted by Hayem) 5,698,000 per cubic millimetre. Elder and Hutchison,[2] from examinations in six infants, give the average of 5,346,000 per cubic millimetre. In thirty-three infants I found the counts within an hour of birth average 6,450,000 per cubic millimetre. Fifteen of those made at the moment of birth gave a mean count of 6,139,000 per cubic millimetre.

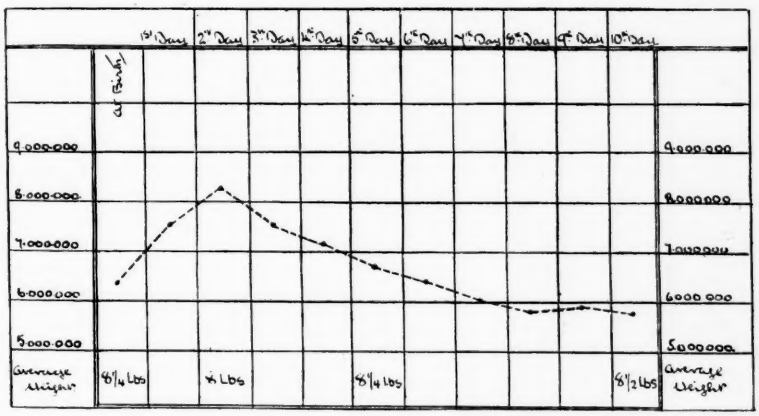
Hayem found that early ligation of the cord made a difference of about half a million in the count, the average after early ligation being 5,080,000 per cubic millimetre, and after late ligation 5,760,000 per cubic millimetre; and Helot[3] gives the average count for the former at 5,080,000 per cubic millimetre, and the latter at 5,985,000 per cubic millimetre. Schiff[4] has shown that this is only a temporary effect. In four infants whose cords were tied comparatively early, and the blood examined within an hour of birth, I found little difference from those ligatured late.

The average of thirty-two counts, *from twelve to twenty-four hours*

after birth, was 7,676,000 per cubic millimetre, individual counts varying from 6,800,000 to 8,600,000 per cubic millimetre. When a number of examinations were made in the same infant, a slight reduction in the number of corpuscles per cubic millimetre was noticed after first feeding. This increase continues, as a rule, during the *second day*, the average of twenty-seven counts at the end of forty-eight hours being 8,358,000 per cubic millimetre.

In three cases the counts gradually fell from the end of the first day, in the others from the end of the second. Thus, twenty-three counts on the third day averaged 7,684,000 per cubic millimetre; twenty on the fifth day, 6,757,000 per cubic millimetre; fifty from the seventh to the tenth day, 5,898,000 per cubic millimetre, the

CHART I.



Curve of average counts of red corpuscles during first ten days.

counts varying from 4,900,000 to 7,000,000 per cubic millimetre. (See Chart I.)

The averages given by different observers show only a slight difference. Otto[9] gives the mean count for the fourth day at 6,165,000 per cubic millimetre; Sörensen[9] for the fifth to eighth days at 5,769,000 per cubic millimetre; whilst Schiff found the average for the first fourteen days to be 5,825,000 per cubic millimetre. Buchut and Dubrisay (V. Limbeck), however, in fifteen infants, from two and a half to fifteen days old, found the very small average of 4,269,911 per cubic millimetre.

The number of red corpuscles varies at different times of the day, counts made after feeding being less than those taken before food. Sickness, diarrhœa, etc., raise the total. Schiff instances a case

which on the first day of observation gave a count of 7,278,000 per cubic millimetre. On the following day, physiological decrease taking place, the count was from 6,600,000 to 6,800,000. Diarrhœa set in on the third day, and, owing to loss of fluid, the count went up to 8,044,000 per cubic millimetre. In one infant whose blood I examined the count on the fourth day of life was 6,600,000 per cubic millimetre. On this day vomiting and slight diarrhœa began, and lasted till the tenth day. On the sixth day the count was 6,400,000 per cubic millimetre, on the eighth 7,200,000 per cubic millimetre, and on the tenth 7,000,000 per cubic millimetre.

As regards the *hæmoglobin*, observers are much more unanimous. At birth the percentage is relatively much higher than in the adult, and continues so during the first fortnight of life. Hayem gives 110 per cent. as the average at birth, and states that it may be as high as 130 per cent. Elder and Hutchison in nine infants found the estimates to vary from 95 per cent. to 115 per cent., the average being 105·6 per cent., using Gower's hæmoglobinometer.

In twenty-two examinations at birth with the same instrument, I found the extremes 98 per cent. and 120 per cent., the average being 106 per cent. A few examinations on subsequent days gave an average of 100 per cent., the individual percentage always being less than that for the same infant at birth.

The amount of hæmoglobin present at birth does not directly correspond with the number of corpuscles, as is shown by the following results:

	Per Cubic Millimetre.	Hæmoglobin.
(1) Red corpuscles ...	5,400,000	100 per cent.
(2) „ „ ...	5,200,000	100 „
(3) „ „ ...	6,000,000	110 „
(4) „ „ ...	6,200,000	105 „

and the individual corpuscle is richer in hæmoglobin than that of the adult.

Schiff gives 104 per cent. as the average at birth, and states that this gradually diminishes during the first fourteen days to 90 per cent., the decrease being relatively greater than that of the red corpuscles during the same period. His observations were made with Von Fleischl's instrument.

The *microscopic appearances* of the blood during the first days of life present certain differences from that of adults. A variation in size and shape of the red cells is noticeable. The difference in size is decided, many very small cells being present. Hayem gives the

corpuscular measurements as from 3·25 μ to 10·25 μ, and, as he points out, the small cells are most numerous during the first and second days. Thereafter the size is much more uniform, though differences are observable after the second week. The difference in shape is less marked, most of the corpuscles showing an almost completely circular outline.

Hofmeier[5] drew attention to the fact that the blood of the new-born seems to have less tendency to rouleaux formation than that of the adult. Occasionally in the early hours no rouleaux are to be found in the fresh specimen, even after careful manipulation. In others the formation is deficient, in others, again, abundant.

In stained specimens some corpuscles show nothing but a faint cell wall, and appear to be without colouring matter. These were first pointed out by Ponfick, and Silbermann[5] found them present in greater abundance when the child's condition during the first few days was much disturbed.

Great difference of opinion exists on the question of the presence of nucleated red corpuscles in the blood at birth. Hayem and Luzet[9] could not find them, and hold that they disappear in the latter weeks of intra-uterine life. Fischl[6] and Loos[13] believe that large numbers are only found during fœtal life, and that they are seldom seen at birth. Neumann, Kölliker, Hock, and Schesinger found them common in the blood at birth, and Elder and Hutchison found them numerous in the blood of the umbilical cord (1 in 8 to 1 in 5 leucocytes).

In blood-films from forty different infants at birth, I found nucleated corpuscles present in all, but varying much in numbers. The highest count was 116 to 500 leucocytes, the lowest 1 in two cover-glasses. In twenty-five films on the first and second days they were present in all but one.

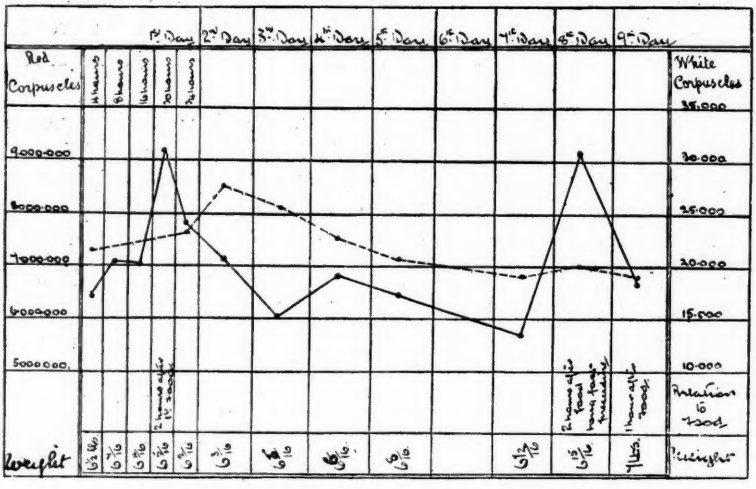
Woino-Oransky[12] did not find them after the fourth day, and concluded that they disappeared from the blood about this time. In twenty-seven differentiations, from the fifth to the ninth day, nucleated red corpuscles were present in twelve. They were found as late as the ninth day.

The prevailing type is the normoblast; but when the number present is large, a few megaloblasts are usually present also. Great variations in the size and shape of cell and nucleus are seen, and many can hardly be classified, as they present resemblances to both normoblast and megaloblast.

During the first hours of life certain fairly constant changes in the weight of the child take place, and these are very closely

associated with the variations in the counts of the red corpuscles. Haake and Winckel[7] found, from the careful weighing of a large number of infants, that all diminished in weight soon after birth, and that the majority had regained normal (birth) weight by the tenth day, and Von Siebold[7] gives the average normal increase of weight for this period as ¼ pound. Of thirteen infants weighed frequently during the first and second days, one gradually increased in weight from birth, eleven lost weight on the first and second days, and one till the fourth day. The average loss of weight during this period was ¼ pound. Daily weighings, after the second day, showed a gradual increase in weight taking place as a rule.

CHART II.



Showing relation between blood counts and weight of child.
Red corpuscles .. .. ——
White corpuscles .. .. - - - - -

Of thirty-six infants weighed at birth, and on the ninth or tenth day, twelve had the same weight as at birth; thirteen had gained ¼ pound; eight ½ pound; and three ¾ pound. The average gain during this period was ¼ pound. Thus, while the weight is diminishing, the count of the corpuscles increases; when the child gains weight, the count falls. (See Chart II.)

The polycythæmia—excessive corpuscular richness of the blood—is held by some observers to be due to an actual increase in the number of corpuscles, by others to an apparent increase due to diminished bulk of the blood. Hayem believes that the increase is mainly due to the very abundant production of new elements,

on account of the fact that when the increase took place he found that it was associated with a greater number of corpuscles of small diameter, and that when the count diminished the corpuscles were, as a whole, larger. The variations in shape and size, and the presence of nucleated red corpuscles, often in large numbers, appear to denote that some degree of new formation is taking place; but it does not seem probable that this can, alone, account for the increase in the red corpuscles per cubic millimetre. Schiff points out that during the first hours the child is taking no food, while there is a continual loss of fluid from the body by perspiration, urine, etc., so that the blood becomes more concentrated.

The loss of weight, occurring in close connection with the corpuscular increase, indicates a loss of fluid. It appears probable, however, that other influences may act towards this increase of the corpuscles per cubic millimetre. The very marked congestion of the skin during the first and second days, the difficulty of getting the blood to flow freely from a puncture at this time, and its dark, almost venous, appearance as it escapes from the capillaries, suggest that in some infants there may be a degree of peripheral stasis.

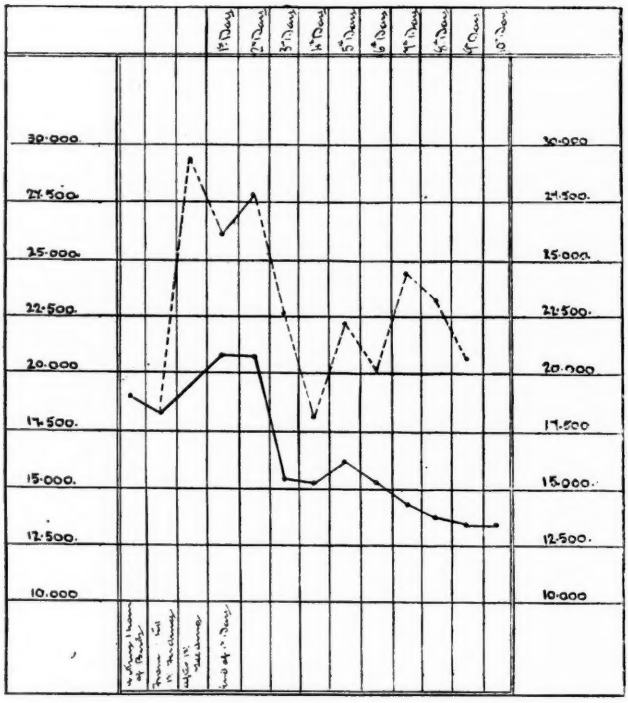
Relative to that of the adult, the blood of the new-born shows a much larger number of *white corpuscles* per cubic millimetre. The counts of the leucocytes vary with different examiners, so that our knowledge of the exact figures is by no means accurate (Rotch).[8] So great are the variations in a sequence of counts in one infant during the first hours of life, that it is essential in detailing the results of examinations to note the age of the child and the relation to the taking of food. Cadet gives 19,500 per cubic millimetre as the average for the first forty-eight hours; Hayem 18,000 for the same period; Bayer[8] 16,000 to 23,000 at birth; and Woino-Oransky 16,900 per cubic millimetre at birth.

In eighteen counts made in different infants within half an hour of birth, and before food, the average was 19,055 per cubic millimetre, the individual counts varying from 16,400 to 23,000 per cubic millimetre. From one hour after birth till the first feeding, sixteen counts were made. These varied from 13,600 to 22,000 per cubic millimetre, the mean being 18,525 per cubic millimetre. The period over which these latter examinations were made was from two to sixteen hours after birth. Nineteen counts during the later hours of the first day, after the first feeding, but without a direct relation to food, averaged 20,915 per cubic millimetre. Under the same conditions on the second day, twenty-one counts gave a mean of 22,800 per cubic millimetre.

After the second day the average gradually falls. Twenty counts on the third day gave a mean of 15,585 per cubic millimetre; ten on the seventh, 14,560; and twenty on the eighth, ninth, and tenth days, 13,553 per cubic millimetre. (See Chart III.)

Hayem states that a sudden diminution in the number of the white corpuscles takes place on the third day, the counts falling

CHART III.



Curve of average counts of white corpuscles during first ten days:
With relation to food .. .. - - - - -
Without relation to food .. ———

from 18,000 per cubic millimetre to 6,000 or 4,000 per cubic millimetre, rising again to 7,000 or 9,000 per cubic millimetre, and remaining so for an indefinite period. He makes no mention of the effect of digestion upon the leucocyte count.

Denis found the diminution in the white cells occurring on the fourth day, and observed that after food there was an increase in their numbers; and Schiff calls attention to the variations in consequence of digestion.

A number of examinations were made with a direct relation to food. Thirteen counts after the first feeding, which took place from four to eighteen hours after birth, gave an average of 29,430 per cubic millimetre—*i.e.*, an increase over the average at birth of 10,000 per cubic millimetre. In five of those cases the count was over 30,000 per cubic millimetre. The greatest increase noticed in an individual case was 17,000 per cubic millimetre. An hour after birth the whites were 16,000 per cubic millimetre. Two hours later the child had its first food, and the count, made three hours after this, was 33,400 per cubic millimetre. The smallest increase was 5,000 per cubic millimetre, the count at birth being 22,000 per cubic millimetre, and an hour after first feeding 26,800 per cubic millimetre. Schiff records a case in which the count, an hour after birth, was 19,000 per cubic millimetre; after its first meal, 27,625 per cubic millimetre; and after its fourth, 36,000 per cubic millimetre.

The average of six counts at the end of the first day, all with relation to food other than the first feeding, was 26,200 per cubic millimetre, and on the second day of four counts, 27,703 per cubic millimetre. On succeeding days the counts were, as a rule, lower, although from the third to the tenth days counts of 30,000 per cubic millimetre were occasionally made, if the feeding had followed a long fast. (See Chart III.)

From the above results, it will be seen that the variation in the number of leucocytes per cubic millimetre, during the hours succeeding birth and before first feeding, is slight compared to that of the red corpuscles. In six infants whose blood was examined on more than two occasions during this period, the leucocyte count increased in two (3,000 to 4,000 per cubic millimetre) and diminished in four (about 2,000 per cubic millimetre), and this while the counts of the red corpuscles increased. The average count was also distinctly less than at birth. The explanation of this is probably that two influences are at work—loss of fluid from the body and fasting, both tending to increase the red corpuscles in the drop, while the former only has this effect upon the white. Fasting has been shown by many observers to lower the leucocyte count in the adult blood.

It would seem, therefore, as if the one influence counteracted the other during the first hours of life. As soon as food is taken the count rises, and the average (without relation to food) during the first and second days is higher than at birth. During the succeeding days a gradual diminution in the numbers takes place. These results, and those of the differential counts following, agree with the theory

of Lepine, Von Limbeck,[9] etc., who held that the leucocytosis of the new-born was due partly to the influence of digestion and partly to that of blood-concentration. Gundobin[12] and others, however, oppose this view.

The effect of digestion upon the number of white corpuscles per cubic millimetre is much greater than in the adult, and this is especially the case after the first food, 10,000 per cubic millimetre being the average increase in the above counts. Increase almost equal to this has been noticed after the first meal by the mouth in adults who have been fed for a time by the rectum. Cabot[10] found, in a case of gastric ulcer, that after the first food by the stomach the leucocyte count rose from 4,000 per cubic millimetre to 15,500 per cubic millimetre, and he suggests the 'novelty' of the food as an explanation. This is borne out by the result of these examinations in infants. Of sixty counts in relation to food, those made during the first two days of life—twenty-three—gave an average of 27,777 per cubic millimetre, whilst those during the third to tenth days—thirty-seven—gave only an average of 21,703 per cubic millimetre.

It is very generally held that the blood of infants has a larger percentage of *lymphocytes* than that of the adult, 40 per cent. to 60 per cent. in the former, and 20 per cent. to 30 per cent. in the latter; and, correspondingly, the polymorphonuclear neutrophiles are less, 20 per cent. to 40 per cent. in the former, compared to 60 per cent. to 70 per cent. in the latter (Kanthack and Hardy,[11] etc.).

In the following differential counts the percentage of lymphocytes was, as a rule, within the above limits, and above that of the neutrophiles, where there was no relative increase in the count of the leucocytes; but when there was a leucocytosis it was associated with an increased percentage of the neutrophiles.

Hayem found that at birth there were relatively more lymphocytes than in adults. Loos and others hold that they exceed the neutrophiles at birth. Elder and Hutchison found the neutrophiles in excess in every case examined (seven). In fourteen differentiations at birth, I found the lymphocytes varying from 46 per cent. to 66 per cent., the average being 55 per cent., and the neutrophiles from 27 per cent. to 46 per cent. In every case but one (the two varieties being practically equal) the lymphocyte percentage was greater than that of the neutrophiles.

In six cases, from one hour after birth till the first feeding, the lymphocyte average was 51 per cent., and the neutrophile 44 per cent., and with one exception the lymphocyte percentage was greater than that of the neutrophiles. With the first feeding and the rise

in the count of the leucocytes, differentiations show a relative and absolute increase in the neutrophiles.

In seven infants in whom the leucocytes were counted and differentiated, after the first food the average was 30,000 per cubic millimetre, lymphocytes 36 per cent., and neutrophiles 59 per cent. In every case the percentage of the neutrophiles was greater than that of the lymphocytes. During the remainder of the first and second days there is a much slighter variation in the percentage between the examinations with food-relation and those without, the majority of the counts both before and after food showing the neutrophiles in excess of the lymphocytes. In six counts with food-relation on the first and second days the average of the lymphocytes was 37 per cent., and of the neutrophiles 56 per cent.; and in the ten counts without food-relation the lymphocyte average was 42 per cent., and the neutrophile 53 per cent.

From the third day onwards there is a gradual return to the condition at birth, the lymphocytes being in excess of the neutrophiles in examinations without food-relation, and after food only a slight increase in the neutrophiles is found. Twenty-two counts were made from the sixth to the tenth day: in eleven without food-relation the leucocyte count averaged 13,900 per cubic millimetre, the lymphocyte average was 60 per cent., and neutrophile 37 per cent.; while in eleven with food-relation the count averaged 20,700 per cubic millimetre, the lymphocyte average was 44 per cent., and the neutrophile 49 per cent. In four differentiations on the ninth and tenth days, two with and two without food-relation, the lymphocytes were in excess in all.

The above results agree with those of Gundobin,[12] who found the neutrophiles from 60 to 80 per cent. during the first two days, and that after the second day there was a gradual diminution in their numbers, so that from the seventh to tenth day there was an absolute and relative increase in the lymphocytes. He holds, however, that the increase in the neutrophiles is due to diminished activity of the retrograde metamorphosis.

The percentage of eosinophiles is relatively greater than in adults. The variation in numbers is marked, but shows no regularity in change, like that of the other leucocytes to food or fast.

In the total differentiations they varied from 1 to 17 per cent., the average being about 5 per cent.

Summary.

1. The red corpuscles in the blood of the infant at birth are relatively more numerous than in the adult. During the first forty-

eight hours of life the number per cubic millimetre increases owing to concentration of the blood (from loss of fluid by urine, perspiration, etc., and fasting). The child loses weight during this period. From the second day, as a rule, a gradual fall in the numbers takes place, so that by the tenth day these are less than at birth (200,000 to 400,000 per cubic millimetre). The child gains weight during this period. During the early days the blood shows variation in size and shape of the red corpuscles, and deficiency in rouleaux formation. Nucleated red corpuscles are present at birth — normoblasts and megaloblasts — the numbers varying greatly. They are found present as late as the ninth day.

2. The hæmoglobin is relatively high at birth and during the few succeeding days, usually over 100 per cent., the individual cells being richer than those of the adult.

3. The white corpuscles, which at birth are two or three times as numerous per cubic millimetre as in the adult, increase in numbers during the first two days of life, owing to the effect of digestion and changes in the volume of the blood. After the third day the number per cubic millimetre diminishes, and by the tenth day it is considerably less than at birth (4,000 to 6,000 per cubic millimetre). Digestion leucocytosis is very marked, especially after the first feedings, and when a fast has preceded feeding in the later days.

The lymphocyte percentage usually exceeds that of the neutrophiles at birth. After the first feeding there is a relative and absolute increase in the neutrophiles (50 to 80 per cent.). This gradually diminishes as the effects of digestion wear off, and the blood becomes less concentrated, till, in the second week, the lymphocytes are increased again as at birth.

The percentage of eosinophiles is, as a rule, greater than in the adult blood.

LITERATURE.

[1] HAYEM : 'Du Sang,' Paris, 1889.

[2] ELDER and HUTCHISON : *Transactions of the Edinburgh Obstetrical Society*, 1894-95.

[3] HELOT : 'Thesis,' Rouen, 1877 (Von Limbeck).

[4] SCHIFF : *Jahrbuch für Kinderh.*, Leipzic, 1892, xxiv. ; and *Zeitschrift für Heilkund*, 1890, xi.

[5] *The Lancet*, 1887, vol. ii., pp. 776 and 826.

[6] FISCHL : *Jahrbuch für Kinderh.*, 1895, xxxix.

[7] *Medical Times and Gazette*, 1862, vols. xv. and xix.

[8] ROTCH : 'Pædiatrics,' 1896.

[9] VON LIMBECK : 'Grundriss einer klinischen Pathologie des Blutes,' Jena, 1896.

[10] CABOT : 'Clinical Examination of the Blood,' 1900.

[11] KANTHACK and HARDY : *Journal of Physiology*, xvii., 1894.

[12] GUNDOBIN : *Jahrbuch für Kinderh.*, Leipzic, 1893, xxxv.

[13] LOOS : *Jahrbuch für Kinderheilk.*, 1895, xxxix.

CRITICAL REVIEW.

SOME RECENT CONTRIBUTIONS ON THE PLACENTA.

By W. E. FOTHERGILL, M.A., B.Sc., M.D.,

Director of the Clinical Laboratory, Royal Infirmary; Assistant Physician, Clinical Hospital for Women; Assistant Lecturer on Obstetrics, Owens College, Manchester.

THE subject of the present review is one which will doubtless occupy considerable space in this Journal in the course of every year. Investigators will from time to time contribute to its pages the results of their work upon special aspects of placentology, and abstracts of similar papers appearing in contemporary journals will constantly be published. An occasional critical review will synthetize advances that have been made in our knowledge, and will mark progress at suitable intervals. Future reviewers will probably deal somewhat fully with a limited number of quite new papers; but in this first instance it seems advisable to consider in a rather more general manner the more recent additions to our knowledge, indicating at the same time the present trend of opinion upon certain unsettled points.

At the very outset we plunge into difficulties, for the discovery during the last three or four years of several very early human ova has shown the complete error of those fundamental conceptions as to the formation of the placenta which have been founded upon the study of the developing eggs of various lower animals. These ideas are still taught; they appear in quite recent text-books, and are, in fact, articles in the creed of the majority of medical men. But they will have to be discarded and replaced. The most valuable side-lights upon physiological questions often come from pathology. Let us approach the question of the origin of the placenta from the pathological aspect. In 1880 Colomiatti,[1] from the study of certain monsters, concluded that when only one artery was found in the cord it might be not allantoic, but omphalo-mesenteric; that is to say, that in fœtuses in which the bladder, urethra, and lower part of the intestine (organs derived from the allantois) are absent, 'the vascular part of the placenta is formed from the umbilical vesicle or yolk-sac, and not from the allantois.' Weigert[2] formed the same idea. Labougle and Régnier,[3] again, on examining a sympodial or syreni-

form fœtus, concluded that the umbilical vesicle had taken on the function of the non-existent allantois. Ballantyne[4] described a sympodial fœtus in 1898, and fully elaborated the subject. He concludes that in these monsters it is common to find, in association with a functionally adequate placenta, the absence of allantoic derivatives and vessels, and of the structures (hind gut) from which the allantois itself is derived. The artery and vein present in the cord in these cases appear to be persistent omphalo-mesenteric or vitelline vessels. Ballantyne holds that the vitelline placenta in sympodial fœtuses may represent a reversion to the type of placenta formation in the hedgehog, an arrangement temporary in the animal becoming permanent in the abnormal human fœtus. Again, he says, it may prove to be true that the early human fœtus has normally a preliminary union between the vitelline vessels and the trophoblast, in which case the condition in sympodia would be a persistence of a state normally temporary in the human embryo. In either case Ballantyne has shown that the existence of the allantois is not necessary to the formation of an adequate placenta. The work of His[5] had previously destroyed the importance of the allantois so far as the formation of the human placenta is concerned, since he showed that the bridge of tissue which connects the embryo with its envelopes is present before the formation of the allantois sac from the hind gut. Minot[6] does not believe that the allantoic ever exists as a free vesicle in the human ovum, and the early ova described by Leopold,[7] Peters,[8] and others fail to provide any evidence that such is the case.

Thus we have no evidence that the allantois enters into the formation of the placenta, but we have evidence from sympodia that the placenta can be well formed when there is no allantois. Again, we have no evidence that the umbilical vesicle itself ever takes any part in the formation of the placenta. The conclusion, therefore, is that neither allantois nor umbilical vesicle, so far as we are aware, plays any part in the formation of the placenta. As shown by Young and Robinson,[9] the two primitive dorsal aortæ of the embryo run backward side by side and at first end in the yolk-sac or umbilical vesicle. With the formation of the allantois, however, they pass out on the body stalk (*Bauchsteil* of His) to the chorion. The umbilical arteries are thus the direct continuations of the dorsal aortæ, and the placenta is an organ of the chorion vascularized by the two dorsal aortæ, which merely run alongside of the allantois as it tunnels the hinder end of the embryo.

The description by Peters[8] of a human ovum only five or six days old has shed much light on the early phases of placentation. Younger

than the ovum previously secured by Leopold[7], Peters' specimen measured 3 mm. in length and 1.5 mm. in breadth and thickness. It contained an amniotic cavity, which was completely closed, being lined by cylindrical cells over the embryo, and by flat cells in its outer portion. Between this amnion and the chorion there were several layers of mesoblast cells, the amniotic cavity being, in fact, embedded in mesoblast. This strengthens the view that the amnion is not formed by folding of the somatopleure, as has hitherto been imagined, but that amnion and embryo are formed from a solid mass of epiblast cells, a central cleavage of which produces the amniotic cavity. The chorionic vesicle in Peters' ovum was lined by a thin layer of mesoblast, while the epiblast took the form of a thick mass of cells, not solid, but sponge-like in arrangement. The irregular processes forming this mass of epiblast formed a network between the ovum and the tissue in which it was embedded, and the spaces in the network were filled with maternal blood. The earliest chorionic epithelium is therefore cellular, and not plasmodial, in nature. The term 'trophoblast,' used by Hubrecht in connection with the fœtal epiblast in insectivora, will probably be applied in the future to the corresponding structure in the early human ovum. This reticulum of rapidly proliferating epiblast cells, taking no part in the formation of the embryo, serves to fix the ovum to the maternal tissue, and to some extent appears to absorb nourishment from the latter, while its processes serve as path-finders for the permanent villi.

In the lacunæ between the processes of trophoblast in the ovum of Peters, the maternal blood was in some places in contact with a layer of flat and irregular cells. In other parts the lacunæ were lined by a layer of nucleated protoplasm whose cell outlines were completely lost. This outermost portion of the trophoblast in contact with the maternal blood must be regarded as the earliest syncytium. The pressure of the maternal blood, and the chemical action of the blood plasma appear to produce a fusion of the outermost trophoblastic cells, which is closely resembled, as pregnancy advances, in the formation of the syncytium covering the chorionic membrane and the permanent villi.

This is a point of some importance, for before the work of Peters was published some of the most careful observers, amongst whom was Webster, considered that the fœtal epiblast in its earliest stage was a plasmodium or syncytium, and not a mass of individual cells. Webster,[10] however, now allows that the syncytium is a secondary product, and is to be regarded as a degeneration of cells into a multinucleated and vacuolated mass or layer. In Peters' ovum the

trophoblast was thicker on the side facing the serotina than on the outer aspect. Its processes, some of which divided irregularly toward their ends, dipped, in places, into the maternal blood sinuses in the decidua.

The whole ovum was embedded in the compact layer of the decidua, lying, so to speak, in a deep ulcer with overhanging walls, which extended over the ovum all round, forming a partial decidua reflexa. The outermost portion of the ovum was covered merely by a layer of fibrinous blood-clot, which occupied the opening by which entrance to the decidua had been obtained. In the neighbourhood of the ovum the decidua was 8 mm. thick; no actual projection marked the site of the ovum, which was indicated merely by a pale area—the fibrinous blood-clot in the congested mucosa.

Peters holds that the fertilized ovum, by means of the phagocytic action of its epiblast, eats its way quickly into the uterine mucosa, and then burrows laterally as well as downwards. The undermined edges of the mucosa form the decidua reflexa, the opening of entrance being filled by a blood-clot, which becomes organized and leaves no trace. This observation confirms the view of Leopold, which led him to propose the terms 'decidua basalis' and 'decidua capsularis' in place of the historical but misleading decidua serotina and decidua reflexa. The observation also does away with the idea that the ovum can 'take root' in the mucosa only after menstruation has exposed connective tissue, and proves the view, which before was merely a supposition, that the human ovum eats its way into the uterine mucosa. There was no maternal epithelium in the cavity containing the ovum. That on the surface of the mucosa was complete, but was lower than usual. The whole mucosa was congested and œdematous, its capillaries being much dilated. Peters traced the beginning of decidual cell formation near the ovum, the connective-tissue corpuscles of the interglandular stroma being enlarged and proliferating freely. There was loosening and degeneration of the epithelial lining of the glands, which near the ovum were stretched at their outer ends, while their lower portions showed hypertrophy of the glandular tissue.

In order to advance further we must form an idea of the state of affairs towards the end of the first month of pregnancy, and this can best be done by synthetizing the descriptions of a number of observers.

The amnion has a lining of a single layer of epithelial cells flattened parallel to its surface. The mesoblast layer of the amnion varies in thickness, and may be differentiated into an endothelium-like layer

next the chorion and a layer next the epiblastic lining, which is largely homogeneous and finely fibrillated, containing but few cells.

The chorion is not as yet distinguished into chorion læve and chorion frondosum, but the villi are more numerous and more branched opposite the decidua serotina than opposite the reflexa. The first true villi appear to be formed by the extension of the chorionic mesoblast into the strands of trophoblast, which first connect the ovum with the decidua, while the majority of the villi grow straight from the chorion as stalks of epiblast, which in turn are penetrated by the mesoblastic stroma. Capillaries appear in some of the villi during the second week, and by the end of the month the villi have been vascularized by the fœtal vessels, with the exception of those near the pole of the ovum farthest removed from the serotina.

At this juncture one of those questions arises on which observers are not yet at one. The question of the covering of the chorionic villi, fundamental as it is, remains the subject of debate. We have to deal with two layers—the deep and the superficial. The deep layer, known since 1882 as the layer of Langerhans, consists of one, or in places of two, rows of cells with lightly staining protoplasm, rounded and deeply staining nuclei. In parts apparently continuous with the superficial layer this row of cells is in other places abruptly distinguished from it. The superficial layer is, of course, the much debated syncytium or plasmodial layer. Varying greatly in thickness, it consists of deeply staining, granular and finely reticulated protoplasm. Vacuolated in parts, it shows no cell outlines, but contains nuclei, rare here, frequent there, which vary in size and in outline, but stain as a rule somewhat lightly. No less than ten different views have been formulated as to the origin of these two layers, which together form the covering of the villi and the chorionic membrane. To discuss these *seriatim* would be intolerably wearisome, and is quite unnecessary, for probably no one now considers the layer of Langerhans to be maternal in origin. Some writers maintain, however, that the syncytium is maternal in origin. Three views fall under this heading, and suggest three maternal tissues as the origin of the syncytium: (1) the epithelium which covers the surface of the mucosa and lines its glands; (2) the endothelium of the maternal bloodvessels; (3) the decidual cells.

As to the maternal epithelium (Merttens and Kossmann), many authors have shown that its changes in early pregnancy are degenerative and not active, and to cover the whole surface of the villi and chorion the uterine epithelium would have to be very active indeed.

The surface mucosa does not come in contact with the ovum, which occupies an excavation in the decidua below its epithelial surface. The fate of the glandular epithelium is known; it forms easily recognisable débris in the gland spaces, and remains alive during pregnancy only in the deepest portions of the glands.

As to the endothelium of the maternal blood sinuses, Peters and others hold that this is not active in early pregnancy, and that the villi do not, except as an occasional accident, penetrate the sinuses. Further, in Peters' ovum, when the lacunæ containing maternal blood had a lining resembling endothelium, it was at the parts next the ovum and farthest removed from the decidua.

Again, the decidual cells cannot form the syncytium, for in Peters' ovum there was syncytium when the formation of decidual tissue was only beginning to appear.

These points are mainly negative, but very positive proof of the fœtal origin of the syncytium is found in the formation of the beginnings of this layer in direct continuity with the trophoblast in the ovum of Peters. While the view that the syncytium represents maternal endothelium still has strong supporters abroad, it may be said that British observers are practically unanimous in regarding this layer of the villous covering as derived from fœtal epiblast.*

Next comes the question as to the origin of the layer of Langerhans. More doubt remains on this point. Eden believes with Leopold that the cell layer in question is mesoblastic in origin. Webster strongly maintains in his recent monograph that the syncytium and Langerhans' layer are both epiblastic, and that the individual cells of the one fuse to form the other as pregnancy advances. The majority of British authors who have not expressed any definite opinion on the point write as if they regarded Langerhans' layer as epiblastic, and in the present communication their example is followed.

After this long discursion into questions of opinion, we may return to the description of actual observations. The few villi which are

* The present writer[11] recently found in connection with a decidual cast of the uterus a small chorionic vesicle about half a centimetre in diameter. This was absolutely unattached to the mucosa, which showed no trace of the cavity in which the ovum must for a few days have been embedded. It had been retained dead for some weeks in utero, and its embryo and amnion had disappeared completely, so that it was largely useless as an 'early ovum.' Its villi had, however, a perfect covering of syncytium, though no trace of decidual tissue was to be seen in connection with it. The idea that the maternal epithelium could have given this complete covering to the chorionic vesicle under the above-mentioned circumstances is, to the writer, unthinkable, and the specimen proves to his mind that the chorionic vesicle with its coverings complete is an entirely fœtal structure.

attached to the surface of the decidua merely by a layer of syncytium appear to be those developed by the vascularization of the original trophoblastic processes. The bulk of the villi which reach the decidua are attached to it by rounded masses of proliferated epithelium (Langerhans' layer). The syncytium over these is lost, and leaves mere traces. The villi do not penetrate the decidua to any great depth. They do not enter the blood sinuses or glands, but may occupy folds in the surface, and so appear deep seated. The decidua at the latter part of the first month is more or less covered by an irregular layer of syncytium, which is often seen to be continuous with that covering the villi, where these are attached to the decidua. Masses of syncytium project from this irregular layer into the intervillous space, and also down between the cells of the decidua. The layer appears to originate from the outer portions of the trophoblast, and to be increased as the ovum grows by the rapid proliferation of fœtal epithelium which characterizes the early weeks of pregnancy.

The decidua vera at the end of the first month is well known. Compact and spongy layers are easily recognised. The surface epithelium is still present, but is cubical or flattened, and has lost its cilia. Diffused degenerative changes are apparent, and appear to be due to stretching and pressure. The glands are obliterated at their mouths and enlarged below, the glandular epithelium being granular, swollen, and degenerated, while much of it lies as débris in the gland spaces. The formation of decidual cells, which begins in the outer portion of the mucosa, has now affected the whole of the compact layer, and extends beyond it. The cells vary indefinitely in size and shape, and are connected with one another in parts by strands of protoplasm. The nuclei are large and round, or oval. The changes which form them include both hypertrophy and hyperplasia of the connective tissue cells of the uterine mucosa, for in most specimens cell division is easily observed. In parts of the vera the capillaries are enlarged into blood spaces lined by a single layer of endothelial cells ; elsewhere no great change is seen. The venules and arterioles are doubtless enlarged, but not so greatly as has been stated. Blood extravasations occur in portions of the decidua, and are considered by Eden[12] to be an essential feature of its structure.

The reflexa, or decidua capsularis, being derived from portions of the vera which overhang the early ovum, is like the vera at its base, but differs from it toward its pole, showing early degenerative changes of a different character from those seen in the vera, and containing in this portion no glands. There are blood spaces in the

reflexa, many of which contain fibrinous clots. Next the ovum, degenerative changes are seen which are most marked at the point farthest from the serotina. A superficial coagulation necrosis of the decidua produces an irregular fibrinous layer, which forms the limit of the maternal tissue, while patches of the same necrosis also occur below the surface. These patches can be seen to consist of swollen and fused decidual cells, whose staining reactions are altered.

In the serotina the distinction between the compact and spongy layers is not so distinct as in the vera. There is no maternal epithelium visible except within the glands. In a few of these near the muscle the columnar epithelium is seen still attached, in others it is loose and irregular, while in most it is separated, and lies in the gland space. The degenerative changes described as occurring in the reflexa are also seen in the serotina. As they do not occur in the vera, it is probable that their cause is contact with the fœtal structures and the maternal blood in the intervillous space. The decidual surface consists of a layer of fibrinous material formed by coagulation necrosis, and distinguishable from fibrin masses containing blood corpuscles, and formed from the maternal blood. Between the points of attachment of the villi, irregular, but mostly flattened, masses of syncytium may be observed. These are in part continuous with the syncytial covering of the villi. Small syncytial masses are also found penetrating the decidua more or less deeply, probably by their phagocytic action. They may be seen in the maternal blood sinuses, which they fill up more or less. They have been taken for the proliferated maternal endothelium. Capillaries are rare in the compact layer, nor are there any arteries or veins, though small tortuous arteries are sometimes found in the spongy layer. The maternal blood enters and leaves the intervillous space by the large sinuses, and there is nothing to show which of these are efferent and which are afferent. Webster[10] protests against the use of the terms 'artery' and 'vein' for the blood-channels in the decidua. He especially decries the depiction of arteries in the processes of decidua, or so-called septa, 'sending jets of red paint out among the villi.' The decidual elevations he finds to be very poorly vascularized, the sinuses opening, for the most part, on the portions of the decidua lying between the hillocks.

Any attempt to give a systematic review of our knowledge of the changes which occur after the end of the first month of pregnancy would far exceed the space at disposal. Some few subjects may, however, be mentioned.

The history of the chorion læve is not without interest. As the

sixth week is reached the intervillous space is found to be shallower in the region of the reflexa than in that of the serotina, and a little later the chorion is separated from the reflexa only by small villi, which are simple in structure, do not branch much, and have few epithelial buds on their surface. They are badly supplied with fœtal blood, and many of them are entirely without capillaries. The villi which are in contact with the remains of the reflexa or with the vera have, as a rule, lost their epithelium, while their mesoblastic core has assumed a hyaline appearance. Where union is complete between the chorionic membranes and the vera (the reflexa seems to disappear for the most part), a layer of chorionic epithelium is described by Webster, thinner than before, and consisting commonly of two rows of cells. His photographs of this epithelium, however, are not convincing.

The method of branching and multiplication of the villi opposite the serotina is not fully understood. Epithelial buds are seen both on the chorionic membrane and on the ends and the sides of the villi. It is probable that buds in each of these positions may receive mesoblastic cores, and so cause branching and multiplication of villi. The marked proliferative activity which characterizes the early fœtal epiblast continues for a time in the chorion frondosum after it has ceased in the chorion læve. Some degenerative changes are seen in it, however, as early as the sixth week. Such are vacuolation and splitting of the epithelium. In sections of the placenta of early growth various masses of the syncytium and cellular tissue are seen lying free in the intervillous space. Some mystification has been caused by these so-called *Zell-knoten*. Webster has cleared up the matter in some degree. He finds three varieties of *Zell-Knoten*. One consists of decidual cells with proliferated fœtal epiblast (Langerhans') forming masses covered more or less by syncytium. This is the appearance presented by sections through elevations of the decidual surface, to which villi are attached. The second appearance is caused by the section of several villi together with processes of decidual tissue, and the third variety is caused by the matting together of several small villi by fibrin deposited from the maternal blood. Simple masses of decidual cells or of proliferated fœtal epiblast may also be seen.

The highest stage of development reached by the decidua vera is attained at varying times during the third month. Thinning then occurs, and the surface epithelium entirely disappears. Thrombosis is noticed in some of the blood sinuses, and there is thickening of the intima in some small arteries in the spongy layer and below it. The

reflexa in the fourth month is largely absent, its remaining portions being thinned and degenerated. It is not probable that extensive adhesions occurs between vera and reflexa, for the latter is seen later, only in places where it is represented by a thin hyaline layer. It is easily distinguished from the vera, which is free from those degenerations which characterize the reflexa and the serotina, and in the fourth month even is but little changed. The relationship between the degenerations in the reflexa and those in the villi in contact with it remains a vexed question. Which of the two is primary, or whether they are independent of one another, has not up to the present time been determined.

Like the vera the serotina thins during the third month, and the above-mentioned fibrinous degeneration of its surface advances by extension downward. Masses of syncytium are seen throughout the decidua, both in intercellular spaces and in blood sinuses. The tips of the villi now penetrate the decidua more deeply than at an earlier date, their stroma, deprived of epithelial covering, being in direct continuity with the decidual tissue. Deposits of fibrin and thickenings of the intima are seen in many vessels.

It is clear that, though degeneration begins early in the decidua, there must be changes other than retrogression, if only in order to form the decidual layer which covers the full-time ovum. Decidual cells may constantly be seen in process of division, and there doubtless is throughout pregnancy considerable new formation of the uterine lining. The writer[13] recently suggested a hypothesis as to the function of the decidual cell, which has not yet, so far as he is aware, been proved to be incorrect, and which has been accepted as probable by certain authors. After the appearances in various pathological and normal specimens had been described, it was pointed out that the chorionic epithelium is recognised to have a phagocytic action upon the maternal tissues. If this is so, how is it that the tips of the villi do not penetrate farther into the uterine wall? It was suggested that the decidual cells have in turn a phagocytic action upon fœtal epithelium. In the formation of the placenta and membranes there seems to be a struggle between two tissues, one fœtal and one maternal. Both tissues suffer in the struggle, and the line of contact between the fœtal and maternal portions of the placenta and membranes is marked by a layer of degenerated and practically dead material—the fibrinous superficial layer of the decidua. To begin with, the fœtal epithelium is the more active tissue, the decidua the more passive, and the former invades the latter. Then the decidua reacts against and checks the

invasion, its superficial layer persisting in the struggle along with the tips of the invading villi. Later both tissues become less active, but the underlying layer of the decidua to a considerable degree repairs the damage to its surface, and soon after the middle of pregnancy healthy decidual cells may be seen close to the surface of the decidua, the fibrinous layer having largely disappeared. The fertilized ovum, in arranging for its own nutrition, attacks the maternal structures. The decidual cell appears to have been evolved as a protection, its functions being to prevent injurious invasion of the uterine wall by the fœtal elements of the placenta. Supposing the decidua to fail in this function under certain circumstances, we have a possible explanation of injurious perforation of the uterine wall by the villi in vesicular degeneration of the chorion. The leading feature of this condition is excessive activity of the fœtal epiblast; it is conceivable that the decidual resistance is in certain cases too weak to deal with an attack more severe than usual.

It will be remembered that Eden[14] in 1896 called attention to the occurrence of fat, which he regarded as nutritive, in certain well-defined regions of the human placenta, and in that of the rabbit. In the young human placenta Eden found minute fat droplets in the epithelial buds, while in the ripe placenta they were found in the epithelial covering of the healthy villi. In the serotina also the decidual cells were shown to contain discrete fat droplets in the perinuclear protoplasm. Webster holds that there is no fatty degeneration in the normal decidua, but that it occurs not infrequently in pathological states. 'The old and long-taught view that the chief degeneration of the decidua is of a fatty nature cannot be held.' Eden's paper does not deal with fatty degeneration, but with a storing in the placenta of nutritive fat. In another communication this author[12] has dealt ably with the changes due to ripening of the placenta in the last two or three months of pregnancy, and has shown that many changes long regarded as due to disease must be recognised to be purely physiological in nature. Obliterating arteritis occurs in many of the fœtal arteries of medium size, and cuts off the circulation in small patches and sometimes in wide areas of the placenta. These changes are accompanied by the obliterative changes in the serotina above mentioned, and largely reduce the size of the functional placenta without interfering with its actual work. The stoppage of the fœtal blood-supply in a portion of the placenta is followed by a stoppage of the maternal circulation in the intervillous spaces in the same portion, the result being placental infarction, well

described by Eden. Whitridge Williams[15] has recently written on this subject. He mentions six varieties of infarct—

1. Small whitish or yellowish areas definitely marked off from the surrounding placental tissue.

2. Wedge-shaped or irregularly-rounded areas, dull-white in colour, and of a striated fibrinous appearance on section.

3. Large areas similar in appearance.

4. A yellowish rim seen running round the fœtal aspect of the placenta, and produced by peripheral infarction.

5. Light-red, solid masses, if small confined to the maternal surface, but if large extending throughout the thickness of the placenta.

6. Dark-red or black areas—'apoplexies'—which are distinct from the other varieties, and are probably pathological while they are simply senile changes.

Williams describes the thickening of the intima of the fœtal vessels, which, with a thickening of the surrounding tissue, obliterates their lumina. The result he states to be coagulation necrosis below the syncytium, as fibrinous changes may be seen within villi which retain their syncytium. The more obvious change is the deposit of laminated fibrin and blood-plates upon the dead villi. This also occurs anywhere where the epithelial covering of a villus is lost, the naked connective tissue appearing to act as a foreign body. The villi which lose their epithelium are, however, as a rule those in which the blood-supply has been cut off. The deposited fibrin fills up the intervillous spaces, matting the villi together and forming white infarcts. Those areas in which blood has rapidly coagulated contain red corpuscles, which colour them and thus form red infarcts. Eden has applied the term 'non-fibrinous infarcts' to masses of villi matted together without any mass of intervening fibrin.

Pitha[16] has recently carried this subject farther by studying the subchorionic cysts of the placenta. These he considers to be very common (occurring once in every five cases), and he holds that their mode of formation is practically identical with that of placental infarcts. When a mass of villi, decidual cells, and fibrin remains in contact with the chorion (fibrous layer), a white infarct is formed. When the contact is broken by fluid excreted by the decidual cells, the accumulation of this fluid between the chorion and the infarct forms a subchorionic cyst of the placenta.*

The amnion has been studied by Lange, with results of some negative interest. It will be remembered that some authors have described the existence of stomata in the epithelium of this mem-

* See abstract in this Journal, vol. i., No. 3, p. 341.

brane. Lange finds the cells flattened parallel to the surface of the amnion, provided mostly with one nucleus, but sometimes with two. There are groups of large cells arranged in two or more rows round a central point. The nuclei of these cells are eccentric or peripheral, being placed toward the outer side of the cells, which vary in shape and have irregular edges. Protoplasmic processes bridge the intercellular spaces. Stomata, however, Lange did not find. He considers the openings between the cells to be lacunæ, formed by the breaking down of degenerated epithelium.

Another point of interest is the separation plane of the placenta, and this has been carefully studied by Webster. He finds that in complete abortions during the early months the ovum separates through the compact layer of the serotina and vera in its middle or outer third. In complete miscarriage during the later months the same holds true as a rule, and at full time the separation is mainly through the compact layer. 'The body of the uterus after complete delivery of the ovum has still attached to its inner surface the main thickness of the decidual tissue which was present before labour began, though it is completely rearranged owing to uterine retraction and contraction.'

This review has reached a sufficient length without even touching upon a vast amount of recent literature, which is either of a controversial nature, or is so widely opposed to the views of the majority of British investigators as to demand special and full treatment if mentioned at all.

REFERENCES.

1 COLOMIATTI: 'Trammenti di embryologia patologica,' p. 27, Torino, 1880.
2 WEIGERT: *Archiv für path. Anat. und Physiol.*, civ., p. 10, 1886.
3 LABOUGLE AND RÉGNIER: *Journ. de Méd. de Bordeaux*, xviii., 1888-89.
4 BALLANTYNE: *Edin. Obstet. Trans.*, xxxiii., 1897-98.
5 HIS: 'Anatomie menschlicher Embryonen,' iii., 1885.
6 MINOT: 'Human Embryology,' 1892.
7 LEOPOLD: 'Uterus und Kind,' Leipzig, 1897.
8 PETERS: 'Ueber das einbettung d. menschl. Eies,' 1899.
9 YOUNG AND ROBINSON: 'Studies from the Anatomical Department, Owens College,' vol. ii., 1900.
10 WEBSTER: 'Human Placentation,' Chicago, 1901.
11 FOTHERGILL: *Trans. Obstet. Soc.*, London, vol. xliii., 1901.
12 EDEN: *Journ. of Path. and Bact.*, 1896.
13 FOTHERGILL: *Edin. Med. Journ.*, 1899, vol. v., iii., N.S.
14 EDEN: *Proceedings of the Royal Society*, vol. lx., 1896.
15 WILLIAMS, WHITRIDGE: 'Contributions to the Science of Medicine,' 1900.
16 PITHA: *Annales de Gynéc. et d'Obstét.*, 1902, vol. lvii., p. 22.

See also

BLACHER: *Archiv. für Gynäk.*, vols. lvii., lix., and lxiv.
MATHAS: 'Autolyse der Placenta,' *Cent. für Gynäk.*, No. 51, 1901.
TROVATI: 'Sulla placenta umana,' *Annali ital. di Ginec.*, 1901, No. 4, p. 311.

REVIEW OF CURRENT LITERATURE

OBSTETRICS.

A Case of Vagitus Uterinus (*Cent. für Gynäk.*, No. 6, 1902).—REIDHAAR, in recording the details of a case of intra-uterine cry, states that Schwartz and Zuntz have experimentally proved that respiration can be excited by the action of carbonic anhydride gas on the respiratory centre in the absence of thermal, mechanical, and electrical stimuli to the peripheral nerves, and that stimulation of the skin has been proved to be the exciting cause of the fœtal cry in other cases which have been published. Thorn published a case in which three sounds followed the bursting of a Barnes' bag, and he concluded that the child had not breathed but that the powerful stimulus, caused by the air escaping from the dilator and forcing its way into the larger air-passages, and impinging on the surface of the body, caused discomfort or pain which found expression in a short expiratory sound. Schaller, in the *Zeitschrift für Geburtshilfe*, Bd. xxxi., Heft 2, describes a case where, during ill-advised turning by an inexperienced accoucheur, the child cried for fifteen to twenty seconds whilst the placenta was stated to have been intact, and the cause assigned was stimulation of the skin.

Reidhaar describes the following case as demonstrating the proof of Schwartz's theory:

Mrs. F., aged twenty-one years, sickened with typhus at the beginning of August, 1900. She developed septic endocarditis with emboli in the liver, lungs, and kidneys. On account of the pulse frequency and albuminuria, it was decided to induce labour. This was undertaken on November 23, 1900, in the thirty-fourth week of pregnancy. The fœtal heart was audible, the rate being 140. The cervix admitted one finger; the head was over the pelvic brim. Without previously dilating the cervix, Reidhaar introduced the smallest metreurynter with ease, and the membranes ruptured. A larger size was now inserted, because the pains were not excited. The attempt to insert the larger dilator was not successful at first, and in a second attempt to insert it violent labour-pains started, which, owing to the patient's weak condition, threw her into a very excited state. At this stage seven clear cries, quickly following one another, came from the uterus, and were loud enough to be heard in the next room. Upon again closing the cervix for two minutes, the sounds were heard as clearly as before. The heart-sounds were now indistinct (frequency 100), but the mother's pulse was more

frequent than before (130). As soon as the second dilator was inserted, the pains grew stronger, the fœtal heart became normal, and the mother's pulse less frequent. A kilogramme weight was attached to the dilator to accelerate its action on the cervix, and an hour after this the largest dilator was inserted. Birth followed in the first vertex position eight hours later, forceps being used. The child was apnœic, but respiratory movements soon became regular in a bath. The puerperium was normal, and at the present time mother and child are well.

The explanation given of the cry is as follows. Air entered the uterus when the dilator was inserted after rupture of the membranes. Repeated attempts at introducing the balloon excited violent contractions of the uterus, which, together with the previously enfeebled maternal circulation (there were signs of septic endocarditis), seriously interfered with the aeration of the fœtal blood; and the amount of carbonic anhydride was increased, and this excited the respiratory centre. From the slowing of the heart-sounds it must be concluded that an interruption in the placental circulation had taken place; and the child could not have cried so clearly and continuously without breathing. Skin irritation and pain can be excluded.

C. L.

Experimental Researches in Eclampsia (WORMSER: *Annales de Gynéc. et d'Obstét.*, Feb., 1902).—The theory of auto-intoxication established by Bouchard for uræmia, and adopted by Rivière for eclampsia, has given rise to many different views, which for the most part are contradictory and conflicting. In consequence, SCHUMACHER (*Beitr. zür Geburts. und Gynäk.*, 1901, Bd. v., Heft 2) instituted at Fehling's clinic a series of experiments on the toxicity of urine and blood serum, not only in normal pregnancy, but in various pathological conditions connected with it. Volhard has shown that a very important factor in such experiments is the technique employed; the intravenous injections of blood serum or urine must be made slowly, and under low and equal pressure; besides this, the temperature of the liquid injected must correspond to the body heat of the animal experimented upon. Acting on these principles, Schumacher follows methods which are beyond criticism, and which give more reliable results than those of his predecessors in this subject.

Before employing pathological fluids experiments were undertaken both with injections of indifferent fluids and with normal urine. A solution of chloride of sodium (6 per 1,000) injected into the jugular vein of a rabbit produced negative results, even if the dose was increased to 80 c.c. per kilogramme of the weight of the animal.

On the other hand, a more *concentrated* solution of the same salt acted differently: a dose of 37 c.c. per kilogramme, a solution of

26 per 1,000, having a density of 1,020 (instead of 1,005 = density of artificial serum) almost killed the animal, and more concentrated solutions could not be given except in diminished doses; or, in other words, its toxicity was increased.

The examination of the urine of healthy persons apart from pregnancy has given very variable results with reference to the quantity necessary to produce the lesions, as already noted by Volhard, who shows the difficulty of exactly expressing in figures the mean toxicity of urine even under normal conditions.

It is worthy of note that in one case the injection was followed by two attacks of epileptiform convulsions, which proves that normal urine contains substances capable of producing attacks of this nature, a quality hitherto believed only to belong to pathological conditions.

With regard to urine excreted by healthy women during gestation and after parturition, it has been claimed that the first was less toxic and the latter more toxic than ordinary urine, and this has been explained by the retention in the gravid organism of toxic substances, which afterwards were rapidly eliminated. The experiments of Schumacher go, however, to disprove this theory, for even with normal urine, apart from pregnancy, the results are quite different; and the author has never been able to prove a diminution or an increase of the urinary toxicity in proportion as the term of accouchement is approached.

The cause of this difference in the results is explained not only in the individual differences of the animals—their age, size, race, etc.—but above all in the degree of concentration of the liquid injected; in other words, on its density, much in the same way as has been previously shown with solutions of chloride of sodium. Indeed, the urines of women, apart from gestation, as well as those in connection with pregnancy and labour, having an *equal density, also have an identical toxicity*. This axiom is further corroborated by the study of pathological urines obtained from patients suffering from nephritis gravidarum, or true eclampsia. Here, again, Schumacher finds little difference in their condition before and after delivery. Further, the amount of albumen has no influence upon the toxicity, which differs little from that of the urine of normal pregnancy. The proof is that urines containing albumen exercise absolutely the same effect after this body had been coagulated by boiling and eliminated by filtration. Another proof is that the urine of an albuminuric patient was found very toxic; its density was 1,020. On adding distilled water this was reduced to 1,010. Now, although 29 c.c. per kilogramme of the original urine had produced a toxic effect, 61·5 c.c. of the diluted urine was supported without the slightest bad symptom.

This experiment has been repeated with the same result with the

urine of several eclamptic patients. In one case the urinary density was exceptionally high (1,050); 2·5 c.c. of this per kilo was sufficient to kill a rabbit at once, while 25·3 c.c. of this same urine, but with the density reduced to 1,020, only produced merely transient symptoms.

The author has not been able to satisfy himself of a diminution of the urinary toxicity during the convulsive stage of eclampsia, nor its increase after the fits, as has been maintained by Ludwig and Savor. Anyhow, the extreme toxicity which is found during eclampsia is not due to the presence of specific bodies, but simply to the fact that in these conditions the urine forms a very concentrated saline solution.

The second series of experiments bears upon the action of blood serum, since the theory of auto-intoxication admits the retention of toxic materials in the blood which should be excreted by the kidneys. The widely different results obtained even at the present day with injections of serum are explained by Schumacher by the fact that even more so than with urine, the details of the experimentation are of extreme importance, being both very difficult and delicate. Serum obtained from blood lost during the third stage of labour was always found much more toxic than urine. On the other hand, the author has not been able to establish any difference of toxicity between the serum of normal parturient patients and those suffering from nephritis or eclampsia.

The gravity of the eclamptic symptoms has no effect upon the degree of toxicity of the serum. Moreover, the serum of the fœtus in such cases is not more toxic than that of the mother, which is contrary to the results already obtained by Tarnier. In three cases of eclampsia the author examined the amniotic fluid, and did not find it more toxic than in normal cases.

The result of all these experiments is thus formulated by Schumacher: 'Neither in pregnancy or the lying-in does there exist a notable difference in the toxicity of the urine or the serum of healthy, nephritic, or eclamptic patients.' The school of Bouchard, Ludwig, and Savor have arrived at conclusions diametrically opposed to these. Schumacher seeks to explain the difference in the fact that one draws a parallel between the action of the urine and that of blood serum upon the organisms of the animals experimented upon. But, as has been pointed out, the urines simply play the part of a saline solution, and their action varies with the degree of concentration which they possess, while with blood serum this is not the case, for on adding distilled water its toxicity is only reduced according to the amount of dilution—that is to say, that a double dose of a mixture of serum and water of equal quantity will have the same result as the simple dose of serum not diluted, whilst the urine diluted in the same proportion will have no effect at all. Serum

acts in virtue of the different toxic substances which it contains, whilst the action of the urine is entirely due to its character of a saline solution more or less concentrated.

Schumacher is not an adversary of the theory of Bouchard, and admits that eclampsia is an affection due to the toxic action of certain products of organic changes; only this hypothesis is not yet proved, and the experiments carried out by Bouchard and his school in support of the theory are not reliable. Schumacher estimates further that the method, which consists in examining the toxicity of urine and blood serum by experiments on animals, is not capable of guiding us further in the knowledge of this disease, which is still to us more or less a mystery.* C. H. R.

Further Researches in connection with the Deportation of Villi, and its Results (SCHULTZE and VEIT: *Cent. für Gynäk.*, No. 7, 1902).—Maternal blood circulates round the periphery of the villi of the chorion; consequently villi, as well as cells from the periphery of the villi, are able to enter the maternal circulation. The question naturally arises whether this process is followed by physiological results similar to those in hæmolysis, and to which Ehrlich's methods of investigation could be applied.

When certain cells are introduced into the living blood, a substance is formed there which fixes these cells to the red blood corpuscles. Part of this substance, according to Ehrlich, enters the serum, and forms an antitoxin which tends to destroy the foreign cells. When villi from the periphery of the chorion become deported into the maternal circulation, there enter not only cells from the connective tissue of the chorion, but also some cells belonging to the layer of Langerhans and to the syncytium, and probably also a portion of the fœtal blood. This process must *ipso facto* result in the formation of a substance injurious to these cells—a cytotoxin, or syncytiolysin, as it may be called for the sake of simplicity.

In order to ascertain the qualities of the newly-formed substance, we introduced pieces of placenta into the peritoneal cavity of the rabbit, taking care to remove previously the blood from the blood-vessels of the fœtus, as well as the maternal blood from the intervillous space; thus, we were almost sure to have introduced nothing but cells from the connective tissue and the periphery of the villi. We believe that neglect of this important precaution accounts for the hæmolysis which occurred in the experiments reported at the Ninth Congress of the German Society of Gynæcologists.

We obtained the following results:

1. The serum of rabbits, into the peritoneal cavity of which we introduced 5 to 10 grains of human placenta, showed no stronger

* This subject was also fully discussed in a Critical Review published in an earlier number of this Journal. *Vide* p. 192.—ED.

hæmolytic effect on human blood than the serum of rabbits not so treated.

2. The serum of pregnant women did not show, on the whole, any hæmolytic effect on the blood of men, or of other pregnant or non-pregnant women.

3. Exceptionally, a slight hæmolytic effect was produced by the serum of pregnant women on the blood of the non-pregnant; we were, however, unable to find the conditions under which this took place.

4. The serum of rabbits, which were treated previously with human placenta, was not poisonous to other rabbits.

5. The serum of two eclamptic women (the one specimen came from Utrecht, thanks to the kindness of Professor Konwer) did not show any hæmolytic properties on the blood of men or of pregnant or non-pregnant women. It was also non-poisonous when introduced in certain quantities into the blood of the rabbit.

6. The urine of rabbits, which were treated previously with human placenta or with placenta from the rabbit, showed, after twenty-four to forty-eight hours, a distinct presence of albumen, which, however, soon disappeared.

7. Fresh pieces of human placenta, which were placed for twenty-four hours in the fresh serum of rabbits previously treated with human placenta, produced dissolution of the nuclei of the syncytium to a greater extent than ordinarily occurs in the serum of rabbits which have not undergone the same treatment.

We consider it necessary to publish our experiments early, because we believe that the constant presence of albumen in the urine of rabbits previously treated with human placenta clearly shows that similar results must be expected when villi enter the maternal circulation.

It is therefore desirable that in cases of albuminuria during pregnancy investigation should be made whether deportation of villi into the maternal circulation is taking place. This would probably not account for all cases of albuminuria during pregnancy. Nevertheless, the relation between the latter and the deportation of villi seems to us important enough to draw to it the attention of other workers, all the more that the anatomical proof of deportation of villi is very difficult. These investigations would undoubtedly help to throw more light on the etiology of eclampsia. H. G.-S.

Pregnancy Complicated by Multiple Intestinal Fibromata—Bilateral Castration in 1890—Pregnancy in 1901—Cæsarean Section at Term, followed by Supra-Vaginal Hysterectomy—Child Living—Recovery of the Mother from the Operation (*Bull. de la Soc. Belge de Gynéc. et d'Obstét.*, tome xii., No. 6, 1901-1902).—JACOBS narrates the case of a young girl, aged nineteen, who for some years had suffered from a large tumour, which occupied the whole abdomen, and extended from the pelvis below to the ribs above.

The fibroids produced severe menstrual and intermenstrual losses, and by their size interfered with the functions of the stomach and intestines. On May 19, 1890, Jacobs performed abdominal section with the view of doing hysterectomy, but owing to the serious condition of the patient he resorted to double castration instead. The operation was an easy one, though the ovaries were deeply situated in the pelvis. Convalescence was normal. The growth at this time consisted of numerous fibroids of all sizes, studding the entire uterine surface, three of them, larger than the rest, projected above the internal os and filled up the true pelvis, rendering the uterus immobile. For three years there was absolute arrest of hæmorrhage, both menstrual and intermenstrual, but the tumour did not appreciably diminish in size, though it became slightly more movable. In 1893 rather profuse bleeding occurred at more or less regular intervals, and by 1895 menstruation became definitely re-established, but there was no metrorrhagia. The tumour had not increased in size. The general health was excellent. During 1899 there was a period of four months' amenorrhœa. This same year the girl asked Jacobs whether marriage was possible under the circumstances, to which he replied in the affirmative, providing her *fiancé* was first informed of her condition, and of the probable unlikelihood of conception taking place. Marriage took place in 1900, and the following year the patient became pregnant and consulted Jacobs. In consultation with Dr. Tournai it was agreed to allow the pregnancy, if possible, to proceed to term, which was calculated to be at the end of December, 1901, and then to perform Cæsarean section and hysterectomy. This was accordingly done on December 26, the abdomen being opened through the cicatrix of the old incision. The child was delivered in eight minutes. While the child was being extracted, the hæmorrhage, which was profuse, was arrested by an assistant grasping the edges of the uterine incision with his fingers. An elastic ligature was then tightly applied round the cervix, and pressure forceps applied on the left side to the round ligament and uterine artery, this side of the tumour being more movable than the right. Five large fibroids which obstructed the pelvis were removed, and the cervix cut across from left to right. The right uterine artery, which was then encountered, was clipped. Forceps were applied to the round ligament and the utero-ovarian artery on the right side, and the mass removed. The points seized were then tied with silk ligatures, and the edges of the cervix were pared and brought together, and covered by peritoneum. The abdominal incision was then closed, no drainage being employed. The patient made a good convalescence and got up on the fifteenth day. Examination of the mass revealed on the right side the presence of the tube intact, and a portion of the ovary, whereas on the left side the

adnexa were represented merely by a stump of the Fallopian tube. The child was well formed, weighed 1,750 grammes, and measured 42 centimetres. The absence of down, the length of the nails, and the general development of the child indicated that the pregnancy had extended to full term. Just as the patient was on the point of leaving the hospital quite bright and well, she suddenly fell down dead in one of the corridors, death being probably the result of an embolus. H. P.

Hydatid Cysts in Pregnancy, Labour, and the Puerperium (FRANTA: *Kystes Hydatiques pendant la Grossesse, l'Accouchement et les Suites des Couches*, Prague, 1901: a monograph written in the Czech language, with tables and summary in French). — Dr. Jaroslav Franta, of the Bohemian University, Prague, has collected and tabulated thirty-five cases where hydatid cysts have caused dystocia, noting five more that are somewhat doubtful. In thirteen the patients were registered as primiparæ, in eighteen as multiparæ, and in four no note on this point was reported. In eight several labours were obstructed by the cysts, the last labour being the worst. In one case after operation two subsequent labours were impeded by cicatrices at the site of the cysts. In twenty cases one big cyst caused the trouble, whilst in fourteen the cysts were multiple. In most cases the cysts lay in the posterior part of the pelvis, in very few were they abdominal. Diagnosis was hardly ever made. In all cases but one the vertex presented, in one prolapse of the cord was noted. The fœtal mortality, greatest when the cysts were multiple, was 60 per cent. In eleven cases the cyst was punctured during labour, usually through the vagina. In four the cyst was incised during labour through the vagina. Only once could the cyst be successfully pushed up above the pelvis during labour. Rupture of the cyst during parturition occurred five times (into vagina, three; rectum, one; connective tissue of labium majus, one). One case resembled that reported by Dr. Haultain in the present number of the JOURNAL,* but a hydatid cyst instead of an ovarian dermoid prolapsed through the vagina during the use of the forceps. The rent in this instance was made by the obstetrician's finger-nail. Uterine tympanites was observed in one case. Total rupture of the uterus occurred three times; in all the mother died. In twenty-six cases the history of the patient during and after the puerperium is noted, and of these the puerperium was normal in six only; but most probably it was so in most of the nine unreported cases, good results being often assumed as understood. Suppuration of the cyst, usually traced to puncture, but in some instances occurring in unruptured cysts from true puerperal infection, is the commonest bad result in childbed. In three cases the cyst cavity acquired communication with the uterus, in one with the bladder, and in one with the rectum.

* *Vide* p. 384.

But of thirty-one cases the death of the mother in the puerperium is noted in nine: three after Cæsarean section (for infection twice, intestinal obstruction once), two after version and manual extraction —the uterus was ruptured in both instances—two after perforation, two after spontaneous delivery—both cases were septic. Seven out of the nine mothers who lost their lives were primiparæ. The maternal mortality is very high in cases of multiple hydatid pelvic cysts. In twenty-two cases an operation was performed during pregnancy, seventeen for solitary, and five for multiple, cysts. These operations are classified thus: Simple puncture, one (fatal); aspiration, two (both mothers saved, abortion in one); rectal and vaginal aspiration, one (fatal); aspiration and drainage with the cannula, one (spontaneous labour at term); simple incision, two (both recovered, pregnancy interrupted in one). Abdominal section was undertaken in fifteen cases; no details in one even as to result; extirpation of the cyst in six (no mothers lost, pregnancy uninterrupted in three, labour spontaneous in two). The operation in two stages (fixation, incision, with packing and drainage) was performed in three cases, with one death. The same procedure at one sitting was performed five times, with two deaths. Only two of the five deaths in this operation series seemed due to the surgical intervention alone. Abdominal section is undoubtedly the safest procedure, otherwise little can be learnt from this series, as the nature and position of the cysts varied extremely. In most cases, contrary to the dystocia series given above, the cysts were abdominal; the risk of opening a cyst in the liver (eight cases, one multiple cyst), spleen (two, solitary), omentum (three, two multiple), broad ligament (one), or in other situations, cannot be calculated under one heading. In nineteen cases the pregnancy led to the detection of the hydatid cyst; in fourteen the cyst was diagnosed before the pregnancy; the tumour tends to increase rapidly during gestation. Spontaneous suppuration during pregnancy was reported in thirteen cases. The cyst may rupture into the bowel or peritoneal cavity. Franta includes as a supplement Paul Bar and Dambrin's two cases, recently published in the *Bulletin de la Société d'Obstétrique de Paris*, of dystocia from hydatid cyst of the pelvis; also another case by the same authorities of rupture of a hydatid cyst of the liver in the third month of gestation, 'hydatid intoxication' with dyspnœa, operation and cure; and also Boissard's case of sudden death four days after delivery during an attack of dyspnœa—hydatid cyst of the liver discovered. Dr. Franta's work is of high value and full of important matter, as the above notice in abstract will indicate to our readers. For evident reasons, explained in part above, no general conclusions can be drawn about a subject with such varied pathological, obstetrical, and surgical aspects. An analysis of each case with the criticism is

of paramount importance, and Dr. Franta's valuable monograph includes such an analysis. Hence, it is much to be desired that the entire work be translated into the English tongue, as, unfortunately, few of us are conversant with the interesting language of Huss and Jerome of Prague. A. D.

Pregnancy and Labour in advanced Tabes Dorsalis (MIRABEAU: *Monats. für Geburts. und Gynäk.*, Feb., 1902).—The patient was married at twenty-two years of age, and at seventeen had acquired syphilis, of which she had had no symptoms since eighteen years old. When she was twenty-six she first showed signs of tabes dorsalis, and, in spite of treatment, this progressed so rapidly that at twenty-eight she was completely paralyzed as regards the lower extremities, and was unconscious of the acts of micturition and defæcation. When thirty years old she had a miscarriage, and later, as a result of a renewed inunction cure, she became pregnant, and this time the pregnancy ran a normal course. Labour followed, and was unexpectedly easy, the pains being sustained and powerful, and absolutely unfelt by the patient; the cry of the infant was the first intimation she had that the child was being born. Cases of labour in patients the subjects of spinal cord diseases are of very rare occurrence, and are of extreme importance as helping to throw some light on the physiology of normal labour. Most of the hitherto recorded cases, as shown by Amand Routh (*Trans. Obstet. Soc. Lond.*, 1897) in a paper on 'Parturition during Paraplegia,' are instances of paraplegia due to compression of the cord from injury or extra-dural disease, and there is no record of a case due to locomotor ataxy. The author of the present paper, after reviewing Golz's experiments on animals and the physiology of the question in general, comes to the conclusion that the present case confirms the belief that the uterus has a motor nerve centre in itself, and that labour can go on normally when the reflex arc between the uterus and the lumbar enlargement of the cord is interfered with or destroyed. In this particular case there was complete loss of the patellar reflex, loss of all sexual feeling, unconscious micturition and defæcation, disturbances of sensation of the upper extremities and complete paralysis of the lower, so that it would appear that sensory impulses were absent at least as high as the bladder and rectum, and therefore presumably as the uterus. T. G. S.

Unusual Case of Rupture of the Uterus (JAQUET: *Zeitsch. für Geburts. und Gynäk.*, Bd. xlvi., Heft 3).—The author said that on July 22, 1900, he was consulted by a young married woman aged twenty under the following circumstances. Ten weeks previously she had been delivered of her first child. The labour occurred between the seventh and eighth month, and was normal in all respects, a midwife only being in attendance. She complained of

hæmorrhage, which had been present continuously since the confinement. On examination, Jaquet found that the vaginal portion of the cervix was small and thin, the os closed and showing not the smallest laceration. Two centimetres behind the cervix was an opening, 2 to 3 centimetres in length, in the posterior vaginal wall. The edges of the laceration bled very slightly, and there was also slight bleeding through the os externum. The sound passed through the os externum showed the uterine cavity to measure 7·5 centimetres, about the normal size for a woman in the tenth week of the puerperium. A second sound, passed through the opening behind the cervix, also entered the uterus, and the two sounds met. A curved sound was then passed through the cervix and brought out at the opening behind it. Jaquet remarked that the opening behind the cervix was obviously that through which the child was born in the natural confinement. A remarkable form of spontaneous rupture of the uterus must therefore have occurred—viz., rupture of the lower uterine segment low down, extending through the vaginal wall and not involving the portio-vaginalis of the cervix, which had fully preserved its nulliparous characters. He suggested that rigidity of the cervix, together with violent uterine contractions, must have led to great distension of the lower uterine segment, and so caused rupture. The woman was married, and showed a marked degree of *mutterfreude*, so that there was no reason to suspect that unskilful attempts at the induction of abortion had been made. The position of the rent being posterior to the cervix excluded the possibility of the latter being an accessory os externum, as in such cases the two ostia were always placed side by side.

At the time of writing the author reported that the patient was again pregnant, and that he proposed, in conducting her labour, to divide the septum between the natural and artificial openings, and not attempt to close the latter. T. W. E.

Some Points in the Anatomy of Tubal Pregnancy during the Early Months (COUVELAIRE: *Rev. de Gynécol. et de Chir. Abdom.*, Jan.-Feb., 1902).—Couvelaire describes minutely the appearances of microscopic sections which he has made through the entire tubal tumour in three cases of early tubal pregnancy, which were removed while the ova were still alive. The pregnancies had lasted four weeks, two months, and three months respectively. In the first case the ovum had been arrested in the isthmus of the tube, in the other two cases in the ampulla.

He draws the following conclusions from his observations:

1. The chorion of the early tubal ovum is everywhere covered with villi.

2. Only a certain part of the early ovum is attached to the wall of the tube; the rest (the free pole) projects into the lumen of the tube.

3. The chorion of the older ova (two and a half to three months) had lost its villi in parts, and there was a tendency to the formation of a discoid placenta, which was attached to that part of the tube opposite the 'free pole.'

4. Up to three months the 'free pole' had not blended with the wall of the tube which it faced.

With reference to the 'free pole' of the ovum he finds—

(1) That up to the third month there is a definite limiting membrane covering the ovum, between which limiting membrane and the tube wall there is no adhesion.

(2) This limiting membrane is formed of an alveolar stroma of dense fibrin, and contains clumps of large cells; it contains no vessels.

He considers that the external capsule of the ovum in the neighbourhood of the 'free pole,' just as in the rest of the periphery of the ovum, is composed of elements arising entirely from the ovum. In other words, he thinks that there is no true decidua reflexa formed from the mucous membrane of the tube and analogous to the decidua reflexa of intra-uterine pregnancy. In this view he differs from Cornil (*vide* JOURNAL OF OBSTETRICS AND GYNÆCOLOGY OF THE BRITISH EMPIRE, No. 1, January, 1902, pp. 93, 99-100) and others. G. D. R.

Interstitial Pregnancy (MURET: *Rev. de Gynécol. et de Chir. Abdom.*, Jan.-Feb., 1902). — Rooswinkel (Dissert. Inaug., 1896, Leyden) states that up to 1896 only seventeen undoubted cases of interstitial tubal pregnancy had been recorded. Muret carefully describes a case.

Patient, aged thirty-four; children six, miscarriages three, the last pregnancy ending in miscarriage at second month, six years previously. Last regular period January 15, 1901. On February 19 (four days late) vaginal hæmorrhage came on; next day it suddenly ceased, and there was severe pain in the left iliac fossa, with collapse and pallor. Attacks of pain and irregular hæmorrhages continued until March 19, when the patient was taken to hospital. Muret saw her on April 21. She was thin, pale, and debilitated, abdomen distended, and a soft swelling like a gravid uterus was discovered rising 6 centimetres above the symphysis pubis; colostrum in breasts, mauve coloration of vagina. On bimanual examination the abdominal tumour appeared to be the enlarged body of the uterus; it varied in consistence from time to time. To the right and in front of it was a small body, which did not appear to be so intimately connected with the cervix as the abdominal tumour. Extra-uterine pregnancy in a double uterus, or even an ordinary intra-uterine pregnancy, were thought of.

On April 28 the abdominal tumour had enlarged; to the left a softer tumour closely connected with it was found.

Operation, May 1; total extirpation (abdominal) of tumour and uterus. The uterus was 14 centimetres long and the same in breadth, from the insertion of the right tube to the left extremity of the organ. A fœtal sac containing a fœtus 16 centimetres long was situated on the left side of the uterus internal to the insertion of the round ligament. There was but little free blood in the peritoneal cavity, but the fœtal sac was covered with fibrin and blood-clot. The patient made a good recovery. G. D. R.

The Occurrence of Milk-Sugar in the Urine of Nursing Women, with a Note on the Best Means for its Differentiation from Grape-Sugar (CARSTAIRS DOUGLAS: *The Scottish Medical and Surgical Journal*, March, 1902).—The author, having been asked on several occasions to determine whether the reduction of Fehling's solution in the urine of nursing women was due to lactose or glucose, has investigated the matter very carefully. He points out that the dietetic, medicinal, or operative treatment of a nursing woman would depend on which variety of sugar was present, and also that the matter is of the greatest importance when examining a female applicant for life insurance.

The occurrence of lactose in the urine of nursing women has been noted for a good many years, and, in order that he might have some personal knowledge of the matter, the author examined fifty-six cases of nursing women. Most of the cases were primiparæ, and 85 per cent. showed the presence of lactose. The remaining 15 per cent. included two cases of pregnant women, and three were mothers who had never nursed at all, so that after eliminating these there remained 96·5 per cent. of cases where lactosuria occurred after full lactation had been established. Most of the observations were made between the third and seventh days after delivery. The author points out that after a patient has ceased to nurse the urine contains sugar for several days. If an examination is made during the puerperium, and a catheter specimen is not available to obviate any fallacies arising from the presence of blood, epithelium, or other elements of lochial discharge, he thinks Allen's method is the most satisfactory way to find out whether sugar is present. In this 7 c.c. of urine are boiled in a test-tube, and 5 c.c. of the cupric acetate solution used in preparing Fehling's solution at once added. A precipitate occurs. After the tube has cooled, add 2 c.c. of a saturated solution of sodium acetate containing a trace of free acetic acid. A further precipitate takes place, and on filtering a greenish-blue solution is obtained, to which is added 5 c.c. of the other part of Fehling's test (the alkaline tartrate solution), and the whole is boiled for fifteen seconds. Cuprous oxide at once separates as an orange-yellow precipitate in the presence of one part of sugar in 500 or less. Supposing uncontaminated specimens of urine can

be obtained, Fehling's and Trommer's tests or nitro-propol (ortho-, nitro-, phenyl-propolic acid) are all good tests to show whether sugar is present, but when it comes to the question whether glucose or lactose is the reducing agent the problem is not so easily solved. He takes a series of other tests, and makes the following notes on them :

Phenyl-hydrazine Test.—Glucose answers very well to this, but lactose does not respond to it at all readily ; and the author, although he has tested urine containing lactose many times, has never succeeded in obtaining the crystalline lactosazone.

Yeast Test.—A very good test for glucose, but lactose itself does not ferment as such. Under the prolonged action of yeast, however, it is inverted into glucose and galactose, and after that alcohol and carbonic acid gas are formed. The author was only once able to obtain a positive result, however prolonged the action of the yeast may have been.

Ruizard's Test.—Boil the suspected fluid with dilute hydrochloric acid, and then apply the phenyl-hydrazine test. This did not act well in the author's hands.

Rubner's Test.—To 5 c.c. of the urine add 4 grammes of solid neutral lead acetate. Boil for two minutes. Add ammonia freely. Heat the mixture once more, when, in the case of lactose, a deep red colour appears, and at length a red precipitate falls. Glucose under similar circumstances yields a chamois-yellow fluid. The author's experience of this test is that, although it is good for pure aqueous solutions, the results are not good when dealing with lactose in urine.

Thus at present there appears to be no very good positive test for milk-sugar in urine, and the author sums up with the statement that 'if you have a urine which responds fairly well to Fehling's test (having excluded fallacies here), but does not yield any crystals with phenyl-hydrazine, and does not ferment (except very slowly) with yeast, you may be practically certain that it is lactose which it contains.' C. B.

Dropsy of the Fœtus (Opitz : *Cent. für Gynäk.*, No. 3, 1902).—The mother was aged thirty-two years ; she had had eleven children, and came into hospital for the induction of labour on account of extreme œdema and amaurosis. The urine was almost solid with albumen. There was scarcely any liquor amnii, delivery was difficult, cranioclasm was performed, a dependent arm was removed, the abdomen was perforated through the diaphragm, and more than a litre of ascitic fluid escaped. Expression of the œdematous placenta caused much hæmorrhage. The placenta weighed 2,280 grammes. The puerperium was normal, the patient soon regained her health, and the albuminuria disappeared.

The fœtal kidneys and bladder were small and ill-developed, the fœtal tissues generally and the placenta were very œdematous. The author suggests that the atrophic condition of the urinary apparatus accounted for the retention of fluid by the tissues. He considered the condition analogous to hydramnios, the œdema of the tissues on the one hand and hydramnios on the other, being each due (according to him) to the presence of a lymphagogue substance. In the case of hydramnios the excess of fluid is excreted by the kidneys, but the latter organs in the present instance were the seat of a round-celled infiltration, which subsequently led to atrophy and inadequacy of function; consequently the fluid was retained within the tissues of the body of the fœtus. C. L.

Eczema in Sucklings (*L'Obstétrique*, Jan. 15, 1902).—QUILLIER, after briefly describing the clinical features, discusses the etiology under four heads. 1. He denies the micro-parasitic causation of eczema. 2. Dentition is also denied to be a cause, except in so far as dentition may cause digestive troubles. 3. The arthritic diathesis, he thinks, has little effect in causing eczema. 4. Overfeeding and indigestion are the common causes. Overfed children tend to the seborrheic form, dyspeptics to the more dry, scaly form. More particularly the author draws attention to the outbursts of eczema in sucklings where the wet-nurse is menstruating, or where, especially, she is eating too much meat or taking beer and other alcoholic drinks. A number of cases is detailed in support of this view. Treatment, accordingly, is chiefly to be directed to the child's feeding. E. H. O.

GYNÆCOLOGY.

Castratio Mulieris Uterina (PINCUS: *Cent. für Gynäk.*, No. 8, 1902).—Under this heading the author gives an account of the artificial destruction of the physiological functions of the uterus during the child-bearing period by the process of *Atmocausis*. This process, as applied to the uterus, consists in cauterization and consequent destruction of the endometrium of the corpus uteri by means of hot steam of the temperature of 110° to 115° C. The endometrium of the cervix uteri remains intact. The result of this mode of treatment consists in total or partial obliteration of the uterine cavity, followed by cessation of menstruation and sterility.

The first case was thus treated in May, 1898:

The patient, a married woman of twenty-six, had two children, and suffered from beginning pulmonary tuberculosis. It was important in her case to bring about sterility, as child-bearing aggravated the pulmonary symptoms. Hot steam of 110° C. was applied for nearly a minute to the cavity of the uterus, and in three

weeks the process was repeated. The patient made a very good recovery, and the result of the operation was satisfactory; the uterus atrophied and the uterine cavity became completely obliterated, menstruation ceased, and the patient's general health improved considerably.

A second case was treated similarly in September, 1900. The indication was chronic Bright's disease. The patient's life was endangered during pregnancy and also after childbirth, in consequence of severe post-partum hæmorrhage. In this case only part of the uterine cavity became obliterated after the operation, and the menstrual period did not appear again.

The author comes to the conclusion that the destruction of the normal uterine functions in women during the child-bearing period by the process of Atmocausis is justifiable, and ought to be recommended in all cases where the patient's health is weakened or her life endangered by loss of blood during the menstrual periods, or by pregnancy and childbirth (tuberculosis, Bright's disease, etc.). The operation is harmless, and the results are satisfactory.

Fritsch mentions this mode of treatment in the last (tenth) edition of his 'Manual on Diseases of Women,' and says that it can be used with satisfactory results in cases where otherwise total extirpation of the uterus might become necessary. H. G.-S.

Hysterectomy for Fibro-myoma of the Uterus.—Bouilly of Paris (*La Gynécologie*, Oct., 1901) records his personal experience of 116 cases of hysterectomy for fibroma performed between October, 1899, and July, 1901. The selection of cases for operation frequently entails grave responsibility on the part of the surgeon, and Bouilly is not in favour of the hasty removal of small tumours producing few symptoms. He reserves operation for cases in which the growth is increasing rapidly, or causes serious trouble, such as pain, hæmorrhage, or deterioration of the general health. In none of his cases was it possible to carry out conservative operations on the uterus. The age of the patients operated upon varied from thirty-seven to fifty-nine years. Most of the cases occurred between forty and fifty years of age, a period of life at which conservative methods, even if practicable, do not possess any physiological importance. In five cases tumours were removed from younger patients—one at twenty-three, one at twenty-five, two at thirty, and one at thirty-two years of age.

In one-sixth of the cases the appendages were found more or less diseased, and in three cases extensive peritoneal adhesions were present. Bouilly does not describe his technique in detail, but he performs supravaginal hysterectomy in nearly all cases. In four cases only he carried out total hysterectomy—once for cancer of the cervix, and in three cases in which the tumours involved the cervix.

In simple cases no drainage is used, but if there has been extensive manipulation, or there is a possibility of peritoneal infection from disease of the appendages, or if raw surfaces have been unavoidably left in the pelvis, a large indiarubber drainage-tube is introduced into Douglas's pouch, and removed at the end of forty-eight hours. The results of his cases are as follows:

Abdominal Hysterectomy was performed in ninety-four cases, with five deaths, a mortality of 5·3 per cent.

Case 1.—Patient, aged forty-eight, much emaciated; enormous tumour; death the day after operation from shock.

Case 2.—Patient aged forty-nine; death on eighteenth day from intestinal obstruction.

Case 3.—Patient, aged forty-seven, had a necrotic tumour in the vagina, and was infected before operation.

Cases 4 and 5 were due to infection following operation, the result of failure of asepsis.

Vaginal Hysterectomy was performed in twenty-two cases, with one death. This patient died from uræmia the day after operation.

Bouilly's figures, therefore, show 116 hysterectomies for fibromyoma, with a death-rate of 5·1 per cent., a result which must be regarded as very satisfactory, especially as in many cases large tumours were removed. A. W. W. L.

On the Principles of Carcinoma Statistics (WINTER: *Cent. für Gynäk.*, No. 9, 1902).—The author points out the importance of establishing a uniform basis on which statistics of cancer of the uterus should be drawn up. With regard to his own statistics these comprehend (1) The primary results; (2) the final results; (3) the percentage of operable cases; (4) the number of absolute cures.

1. With regard to *primary results* the exclusion from the records of deaths which appear to have no connection with the operation is to be deprecated. Some authors exclude death from embolism, pneumonia, etc. On these lines Knauer works out the primary mortality in Vienna (Chrobak and Schauta) at 5·6 per cent.

2. In estimating *final results*, Winter lays stress on the following points:

(*a*) A definite period must be fixed, and all operation cases included.

(*b*) Final results should be subdivided into (1) those cases where death was attributable to the operation; (2) those in which death was due to some other disease; and (3) the forgotten cases. The latter amount to 2 per cent. in Winter's statistics and 9 per cent. in Knauer's; as these form an uncertain factor, Winter advises that they should be exclued. Palliative and incomplete operations, if begun with the view of performing total extirpation, must be included in the statistics.

Gyn. Staff Room University Hospital.

(*c*) Five years is regarded as the time which must elapse before a final cure from operation can be pronounced.

(*d*) The examination to decide upon the presence or absence of recurrence must be made in the hospital where the operation was performed; on this point patients' letters can only very exceptionally be made use of. Statements regarding cases of death are most reliable, as the cause of death is easily ascertained.

(*e*) Waldstein based his statistics of recurrences from fatal cases only, claiming that this principle had the advantage of excluding a series of doubtful ones; but this gave too favourable a view of the results, since all cases still living were counted as healthy.

(*f*) Calculations on recurrence of special forms of uterine cancer must be made with great caution. The division into corporeal and cervical cancer is easily determined, but recurrences of the separate kinds of cervical cancer involve a careful microscopical examination of the extirpated organ, and on this point Winter and Krugenberg, whilst working on the same material, arrived at a difference of 14 per cent. in their calculations.

(*g*) Division of recurrent cases into 'local' and 'spreading' is useless.

3. Statistics of the *operable cases* establish an interesting comparison between the material of the various hospitals and nations, and also between the principles of the individual operators and between the success or capabilities of the various methods; this calculation is absolutely essential in estimating the number of absolute cures. The above determination is very difficult to make, and must include an investigation of carefully kept notes from polyclinics and of the operators' private practice.

4. The percentage of absolute cures must be calculated with due regard for all inoperable cases, and from it alone we can judge concerning the value of the various methods of operation. In arriving at his estimate of absolute cures, Waldstein excludes his 'primary' mortality cases; and Winter's opinion is that, since the primary results depend upon such outside factors as asepsis, methods of technique, disinfection of the growth, etc., it is better, in estimating the number of absolute cures, to exclude primary results from the calculation, and to base the latter upon the number of operable cases and the final results. The number of absolute cures for the various clinics are as follows:

Berlin	9·5	per cent.
Leopold's	10·8	,,
Kaltenbach's	10·0	,,
Schauta's	4·3	,,

The latter is calculated from Waldstein's latest estimates of 14·7 per cent. of operable cases and 29·5 per cent. free from recurrence. C. L.

On an Unusual Case of Ovariotomy (KRABBEL: *Monats. für Geburts. und Gynäk.*, Feb. 1, 1902).—Although a large number of ovariotomies are extremely easy operations, the author deprecates the belief that this is always so, and describes the following case not so much on account of its difficulty but because of the great interest of the whole case. The patient was small and slight, a teacher in a school, had a scanty moustache and whiskers, clear voice, not protruding thyroid cartilage, and flat breasts. The abdomen was prominent because of a large tumour, and there was an apparently well-developed penis without prepuce, urethra, scrotum, or testicles, but with hypospadias and two labia. Under an anæsthetic a small vagina and cervix could be made out. After removal the tumour, which weighed 23 pounds, was found to spring from the left broad ligament attached to a small uterus, and along with the tumour was a small growth which was supposed to be an ovary, but was really a parovarium. The tumour, which was a multilocular cyst, recurred a year and a half later, and was again removed. This time the tumour was described as a teratoma, complicated by sarcomatous and myxomatous parts with epithelial enclosures. Krabbel considered the tumour an embryoma (Wilms), and suggested that the case was one of pseudo-hermaphroditismus feminus, in which there had been neither emissions nor menstruation. No further recurrence of the tumour has at present taken place. T. G. S.

The Treatment of Pelvic Suppuration.—FAURE (*La Gynécologie*, Oct., 1901) gives a detailed account of the methods of treatment applicable to the various types of suppurative inflammation of the appendages and pelvic peritoneum.

All forms of pelvic infection *may* undergo spontaneous cure without operative measures. The basis of medical treatment consists in absolute repose, with frequent vaginal irrigations of hot antiseptic fluids. Lavage of the rectum with hot water is of value in promoting the recovery of diseased appendages and the absorption of peritoneal exudation. Great benefit may also follow the use of mineral waters, and in selected cases massage of the pelvic organs by the Thure-Brandt method. Faure is not in favour of dilatation and curettage in cases of acute salpingo-oöphoritis, although he states that gradual dilatation and drainage of the uterine cavity may occasionally bring about the evacuation of a pyosalpinx through the uterus. This method cannot, however, be recommended.

The surgical treatment may be by incision and drainage of the pus sacs, or the diseased appendages may be entirely removed. Whilst the latter procedure would appear to be the more satisfactory,

experience has shown that in a large proportion of cases, simple incision and drainage is sufficient to effect a cure. Vaginal hysterectomy for the treatment of bilateral suppurative disease of the appendages was introduced by Péan, and more recently, especially in America, the removal of the uterus along with the appendages through the abdomen has been extensively adopted. This last operation, since the technique has been so much improved, is not appreciably more dangerous than the vaginal operation.

It is certainly inadvisable to operate during the acute stages of suppurative disease of the appendages unless the symptoms become dangerous to life. Many cases are much improved by medical treatment. The purulent foci diminish in size, the accompanying peritonitis subsides, and, further, the pus loses its virulence, often indeed becoming sterile. Faure considers that if at the end of one or two months the symptoms and physical signs of pelvic suppuration persist, and the patient is losing ground, an operation should be undertaken. In *non-suppurative* inflammation of the appendages the symptoms may persist indefinitely without any risk to life, and the mere presence of an enlarged ovary or thickened tube does not justify its removal by operation.

Faure describes in detail the technique of posterior vaginal section for pelvic suppuration. If the pus is in the pouch of Douglas, simple incision will suffice. Frequently, however, the pus is contained in the enlarged Fallopian tube. The finger must then be carefully introduced into the vaginal wound, and bimanual palpation carried out. If, however, adhesions are present, obscuring the relations of parts, the fingers should follow the posterior wall of the uterus, and pus collections high up in the pelvis may thus be readily reached. The use of all sharp instruments is to be avoided; a curved pressure forceps may be introduced to evacuate the pus sac. Search must also be made for encysted purulent collections, which must be emptied. Free and prolonged drainage is provided for by the introduction of a large indiarubber drainage-tube into the centre of the cavity. The risks of this operation are slight, though real. They include: (1) Hæmorrhage; (2) wound of ureter; (3) injury of rectum; (4) laceration of bowel. These accidents can all be avoided by careful manipulation. Rosenblat has recently collected statistics of 331 cases with five deaths (1·7 per cent.), and it is doubtful if these could be attributed to the procedure itself. This operation gives excellent immediate results and many permanent cures.

In cases of *acute* pelvic inflammation, often occurring in the course of chronic lesions of the appendages, vaginal section is strongly indicated, and often no further operation is required.

The vaginal route has of recent years been adopted for the removal of tubo-ovarian inflammatory tumours. Sometimes this may be a

simple proceeding. If, however, extensive adhesions are present, necessitating considerable traction, there is grave risk of injury to the bowel, and the operation may be very tedious and difficult. If both appendages are involved, vaginal hysterectomy is the best operation to perform. The indications, then, for vaginal salpingectomy are exceptional, and it should be reserved for certain cases of unilateral disease of the appendages.

Faure describes minutely the operation which he performs for the removal of pelvic inflammatory masses by abdominal section. He lays special stress on the absolute necessity of the raised pelvic position, and careful isolation of the general mass of intestines by gauze compresses. After separation of adhesions, the broad ligament is divided in sections, each bleeding point being ligatured separately. A continuous suture now unites the cut edges of the broad ligament, entirely closing the peritoneum over the cavity made by removal of the tumour. He condemns the use of silk sutures and ligatures, and obtains excellent results from cat-gut. Drainage through the pouch of Douglas, or exceptionally through the abdominal incision, must be used if there is any danger of infection, or if the pelvic peritoneum is lacerated or roughened from extensive adhesions. The introduction of a gauze drain, or tube, through the pouch of Douglas is very simply performed, and provides for the free escape of effused fluid at the lowest point of the abdominal cavity.

Numerous statistics have been published on the results of bilateral removal of the appendages. The mortality at the present time is hardly more than 5 per cent., even making allowance for very complicated cases. The after-results, though good, are not perfect. Most of the patients remain very well. A certain number, however, continue to suffer from the presence of the infected uterus. This operation has no direct effect on the uterus, beyond producing some atrophy. The phenomena of metritis continue, and Richelot has found it necessary to subsequently remove the uterus in no fewer than 53 cases out of 300 women who had had the appendages removed. Pozzi has advised that after this operation the uterus should be curetted in all cases, and he performs this about a month after the abdominal section.

Faure, therefore, is of opinion that in cases of bilateral disease of the appendages the uterus should also be removed at the same time; inasmuch, however, as before operation it is often impossible to estimate the extent of the disease of the appendages, he favours the abdominal route rather than the vaginal radical operation, as it is not justifiable to remove the uterus if the appendages of one side are healthy or only slightly diseased. If, however, it is certain that both appendages are disorganized, the vaginal radical operation should be performed. A. W. W. L.

Colpotomy, the Operation of Selection in the Treatment of Pyosalpinx (HECTOR TREUB: *Rev. de Gynécol. et de Chirurg. Abdom.*, Jan.-Feb., 1902).—Since September, 1899, Treub has treated every case of pyosalpinx and hydrosalpinx that has come under his care by means of colpotomy. His procedure is as follows: the cervix uteri is drawn down to the vaginal orifice by means of volsella forceps; a transverse incision is made with scalpel or scissors through the posterior vaginal wall into Douglas's pouch; two fingers are passed through the opening, and one of them is thrust through the wall of the tubal cyst, and any septa found therein are broken down. The contents of the cyst having escaped, the cavity is irrigated with boracic lotion, and then packed with iodoform gauze. If the cyst-wall resists the pressure of the finger, it is perforated with forceps, which are opened as they are withdrawn. The gauze is removed in five to six days, the cavity irrigated, and again packed for four to five days, after which irrigation is generally sufficient to effect a cure.

The size or situation of the tumour, the quality of its contents, the presence or absence of adhesions, make no difference to the method of operation. Sixty-five cases of pyosalpinx and thirteen cases of hydrosalpinx have been thus treated, and short notes of each case are given.

The danger of the operation is slight. Two cases of pyosalpinx died after operation, but they were desperately ill before, and the operation had probably little to do with the fatal result. Twice the intestine was wounded at the time of operation, and in several other cases fæcal fistulæ appeared some days after. These fistulæ healed spontaneously in all but one case.

Forty-four cases of pyosalpinx were cured without relapse; ten were cured after one relapse or more. Four of the cases which were not cured were tubercular in nature. Ten cases of hydrosalpinx were cured without relapse.

Treub draws the following conclusions:

1. Where operation is necessary for tubal cysts, colpotomy should always be chosen.

2. Where the tumour after operation refills, colpotomy should again be performed.

3. If repeated colpotomy fails to cure pyosalpinx, vaginal hysterectomy is indicated.

4. Tubercular pyosalpinx should be treated by vaginal hysterectomy unless the general condition of the patient forbids it.

5. When a hydrosalpinx relapses after colpotomy, the advisability of some conservative abdominal operation should be considered.

G. D. R.

Causes of Salpingitis other than Gonorrhœal (DEARER and KEMP: *Amer. Journ. of Med. Sci.*, March 1902).—In approaching this

subject two phases present themselves, the surgical and the sociological. The authors think that the sociological is of no less importance, if not of more, than the surgical. They state that there is an idea very prevalent among the laity, due, perhaps, to a careless manner of speaking among the medical profession, that salpingitis and pyosalpinx have their origin alone in gonorrhœa. This conviction is so deeply rooted in the minds of the laity, and in a great measure in the minds of physicians, that it is difficult to alter. As a consequence many women are greatly misjudged, and the general recognition that gonorrhœa is not the only cause of salpingitis is of the greatest importance to unmarried women and innocent husbands. They think it is very difficult to determine how great a proportion of these cases are of gonorrhœal origin. This is owing to the fact that when the cases come to operation the disease has usually been long established, that the gonococcus is so difficult to cultivate, or that a doubt may arise whether the micro-organism found may not be present as a secondary infection, and not as the cause of the disease. Various eminent authors place the proportion from 20 to 80 per cent., such a wide discrepancy being a proof of the difficulty in determining the true percentage.

The causes of salpingitis other than gonorrhœal that have especially attracted the authors' notice are:

Post-puerperal infection.
Appendicitis.
Tuberculosis.
Minor gynæcological operations.
Indiscriminate and careless use of the douche.

C. B.

Pelvic Lesions in relation to their Distinctive Effects upon Mental Disturbances (HOBBS: *Amer. Gynæcol. and Obstet. Journ.*, Feb., 1902).—This paper is a plea for a systematic pelvic examination of all female insane patients. Asylum statistics show that married women predominate over the single in these institutions, and the solution of this fact, the author believes, is to be found in their greater liability to injury and disease entailed by maternity, with its sequence of ill-health and nerve depreciation, ending so frequently in mental degeneration.

The result of pelvic examination, which was always done under an anæsthetic, of 1,000 females in the Asylum for Insane, London, disclosed the presence of pelvic disease or abnormality in 25 per cent. The various lesions found in these 253 cases are classified into groups, the principal gynæcological lesion in each patient determining the position in the classification. There were forty-one cases of ovarian disease which called for treatment; by hysterectomy in seven cases; single or double oöphorectomy in twenty-five cases; and in

the remaining nine a part of one or both ovaries was preserved after removal of the diseased portions.

The mortality from these operations was 5 per cent. The results as regards the mental condition were as follows: recovery in twenty cases, or 49 per cent., distinct mental improvement in 25 per cent.

In sixty-eight patients it was found that the main lesion presented was a displaced uterus. In fifty-four of these the round ligaments were shortened, in seven ventro-fixation was done, and in seven others total extirpation for complete procidentia. There were two deaths following hysterectomy, one from secondary hæmorrhage, caused by the patient pulling out the ligatures, and the other from bedsores two months after treatment. The mental condition was restored in twenty-eight, or 42 per cent., and in fifteen others, or 23 per cent., the mental condition was more or less improved.

In sixteen cases there were tumour growths, nine fibroid, two cervical epithelioma, one sarcoma of the body of the uterus; two had tubercular disease of the pelvic organs, and two had inflammatory deposits in and around the uterus. For the treatment of these conditions abdominal hysterectomy was done in eight cases, vaginal hysterectomy in four, myomectomy in one, and cœliotomy with use of saline lavage in the tubercular cases. There was one death, the other fifteen patients making good physical recoveries.

There were only two cases which recovered mentally, in six others the mental state was improved.

In sixty cases the main lesion was a diseased or injured cervix, in nearly all of which there was an accompanying endometritis or subinvolution. Following surgical treatment, there was complete mental relief in nineteen, or 31 per cent., and improvement in 23 per cent.

In fifty-two patients it was deemed necessary to curette for subinvolution or endometritis. Mental recovery took place in 48 per cent. of the cases, improvement in 21 per cent.

In eighteen patients laceration of the perineum, accompanied by varying degrees of prolapse of the vaginal wall, was found to be the main lesion. Following operation, mental recovery took place in 39 per cent., improvement in 17 per cent.

As regards the phases of lunacy most susceptible to alleviation on the removal of the pelvic sources of irritation, it was found that acute insanity stands first. In the acute mental affections recovery took place in 61 per cent.; then followed melancholia with 58 per cent. of recoveries; and puerperal insanity the last with 53 per cent. In the chronic cases melancholia yielded much better results to surgical treatment than mania, there being 46 per cent. of recoveries in the former to 25 per cent. of the latter.

Replying to criticisms which have been brought forward as to the

correctness and value of these statistics, the author, in conclusion, records the following interesting facts: the provincial government official records of the London Asylum show that for the twenty years preceding the introduction of systematic surgical treatment the annual rate of discharges of patients recovered and improved was for the male residents 35·23 per cent., and for the female 37·5 per cent. For the last ten years in which gynæcological surgery has been in vogue, in addition to the ordinary method of treatment, it is found that the annual rate of discharge among the men differed very little from that of the two previous decades, being 35·92 per cent. It is found, however, that the rate of discharge during the same period among the female patients had advanced from 37·5 per cent. to 52·7 per cent. An official analysis was also made concerning the number of readmissions of those who had been discharged during this period. It was found that, though many more women had been discharged than men, the number of readmissions was the same for each sex, being nineteen women and nineteen men.

The paper is well worthy the attention of all those who have to do with the care of the insane. W. F.

INDEX OBSTETRICUS.

Centralblatt für Gynäkologie, February and March, 1902.

No. VIII.—Etiological Contributions to Vaginal Infection ... ... DONATI.
Pathology and Diagnosis of Cervical Tubercle ... ALTERTHUM.
Castratio Mulieris Uterinæ ... ... PINCUS.
No. IX.—On the Principles of Carcinoma Statistics ... ... WERTHEIM.
Posterior Parametritis, a Rectal Disease ... ... MUELLER.
No. X.—A Short Report upon a Third Series of Thirty Operations for Carcinoma of the Uterus ... ... WERTHEIM.
The Cervical Segment and Contractio Prævia ... ... BAYER.
Traumatic Granuloma of the Female Bladder ... KOLISCHER.
No. XI.—Vaginal Myomectomy and its Relation to Enucleation and Total Extirpation ... ... THORN.

Monatsschrift für Geburtshilfe und Gynäkologie, March, 1902.

On a Rare Indication for Supra-Vaginal Amputation of the Uterus KLEINHAUS.
A Male Pseudo-Hermaphrodite ... ... WEISSHART.
A Contribution to Human Hermaphroditism ... ... HEUGGE.
On Marriage in Relation to Hypospadias and Hermaphroditism NEUGEBAUER.
The Occurrence of Pelvic Contraction in the Lying-in Institution at Stettin BAUER.
On Tubo-Abdominal Fistulæ... ... ... HAECKEL.
On the Tubal Implantation of the Human Ovum ... ... HEINSIUS.
Ureteral Surgery ... ... PERLIS.

Annales de Gynécologie et d'Obstétrique, February, 1902.

Contribution to the Pathogeny of Psychical and Convulsive Troubles provoked or exaggerated by Menstruation ... ... VAILLON.
The Treatment of Rupture of the Uterus, with a Report of Seventy-Seven Cases ... ... DRAGHRESCO and CORNÉLIUS CRISTEANCE.
A Case of Aseptic Suppurative Salpingitis ... ... LEGROS.
Experimental Researches on Eclampsia ... ... WORMSER.

March, 1902.

Hydatid Cysts of the Pelvis and the Abdomen in Relation to Dystocia FRANTA.
An Obstetric Case of Depressed Fracture of the Frontal Bone Cured by Elevation ... ... VILLARD and PINATELLE.
The Practice of Obstetrics and Gynæcology at St. Petersburg ... ... KATZ.

Revue de Gynécologie et de Chirurgie Abdominale, January and February, 1902.

Colpotomy, the Operation of Selection in the Treatment of Pyosalpinx TREUB.
Interstitial Tubal Pregnancy ... ... MURET.
Some Points in the Anatomy of Tubal Pregnancy in the Early Months COUVELAIRE

Revue Pratique d'Obstétrique et de Pædiatrie, January and February, 1902.

Expulsion of the Placenta ... ... PINARD.
A Case of Lumbo-sacral Spina Bifida ... ... BROCA.
On the Treatment of Apparent Death of the New-born Child ... ... RUDAUX.

Comptes Rendus de la Société d'Obstétrique, de Gynécologie et de Pediatrie de Paris, January, 1902.

Complete Rupture of the Uterus in a Case of Hydrocephalus ... ... RUDAUX.
Should the Employment of Sterilized Milk be Recommended in Cases of Mixed Feeding and at the Time of Weaning? (*Discussion*) ... GUINON. MARFAN. PINARD.
Symphysiotomy in Cases of Persistent Brow Presentation ... ... WALLICH.

Bulletin de la Société Belge de Gynécologie et d'Obstétrique, January, 1902.

Fibroids of the Uterus Complicated by Hæmatoma of the Ovaries and Tubes LANWERS.
Pregnancy and Fibroids ... ... JACOBS.
Pelvic Arthritis ... ... VAN HASSEL.

Revue Mensuelle de Gynécologie d'Obstétrique et de Pædiatrie de Bordeaux, January, 1902.

The Best Surgical Methods of Dealing with Cancer of the Breast CHAVARRAZ.
Cephalic Embryotomy followed by Separation of the Cranial Bones DAVAIGNEZ.
A Case of Bilocular Hydatid Cyst of the Parovarium containing Albumen BOUVIER.

Journal d'Accouchements, March, 1902.

Labour induced at the Eight Month for Pelvic Contraction ... ... CHARLES.

La Gynécologie, February, 1902.

Chronic Parenchymatous Nephritis ... ... SIREDEY.
Diagnostic and Prophylactic Elytrocœliotomy in Tubal Abortion ... SPINELLI.
Gynæcological Prophylaxis ... ... BOSSI.

Annali di Ostetricia e Ginecologia, January, 1902.

Pelves of Assimilation ... ... TRIDONDANI.
On a Tabular Type of Temperature in the Puerperium ... ... DELLA VALLE.
Some Observations on the Urine of the New-born in the First Day after Birth ... ... FERRONI.
Observations on the Resistance of the Blood Corpuscles of the Human Fœtus at Different Stages of Development ... ... GARDINI.

Archivio di Ostetricia e Ginecologia, January, 1902.

The Dimensions of the Limbs in Relation to the Anterior Biparietal Diameter of the Fœtus in the Last Months of Gestation ... ... ALFIÈRI.
Anatomical and Clinical Contributions to the Study of Congenital Diaphragmatic Hernia ... ... MAFFI.
Uterine Fibroma Complicated by Fibroma of the Adnexa ... ... RONDINO.

February, 1902.

Auto-intoxication and Auto- or Pseudo-Infection in Pregnancy and the Puerperium ... ... BARONE.
On Longitudinal Hypertrophy of the Vaginal Portion of the Cervix Uteri BERTINO.
Short Considerations with regard to the Toxæmia of Pregnancy CRISTALLI.

La Clinica Ostetricia, February, 1902.

Infant Feeding: its Relation to Infant Mortality ... ... LA TORRE.
On the Morphological Constituents of the Blood of the New-born MAGNANIMI.

January, 1902.

Resection of the Rectum *per Vaginam* ... ... MURPHY.
On the Morphological Constituents of the Blood of the New-born MAGNANIMI.

American Journal of Obstetrics, February, 1902.

Fibromyomatous Tumours of the Vagina ... ... SMITH.
Significance of Fever during the Puerperium ... ... MORAN.
Six Cæsarean Sections ... ... DAVIS.
Three Cases of Cæsarean Section, one Complicated by Pyosalpinx ... COLES.
A Case of Cæsarean Section ... ... NORRIS.
Pelvic Lesions in Relation to their Effects upon Mental Disturbances... HOBBS.
A Case of Non-surgical Premature Menopause ... ... WALTER.
On the Etiology, Histology, and Usual Course of Ectopic Gestation ... BANDLER.
A Case of Myosarcoma of the Uterus ... ... JACOBI.
Criminal Abortion ... ... BALLOCH.
A New Method of Tamponing the Post-partum Uterus ... ... HOLMES.

American Journal of the Medical Sciences, March, 1902.

An Experimental Investigation of Puerperal Pyæmia ... ... GAERTNER.
Causes of Salpingitis other than Gonorrhœal ... ... KEMP.

Bulletin of the Johns Hopkins Hospital, March, 1902.

A Case of Labour in a Bicornuate Uterus ... ... BETTMAN.

The Medical News.

Ventrofixation ... ... PEDERSEN.

The Scottish Medical and Surgical Journal, March, 1902.

The Occurrence of Milk-Sugar in the Urine of Nursing Women
CARSTAIRS DOUGLAS.

The Glasgow Medical Journal, March, 1902.

The Treatment of Uterine Fibro-myoma ... ... EDGAR.
Case of Obturator Hernia of the Ovary ... ... LICKLEY.

The Medical Chronicle, January, 1902.

Spinal Anæsthesia in Gynæcology ... ... LEA

Lancet, March 8, 1902.

Abdominal Hysterectomy for Cancer of the Uterus ... ... O'CALLAGHAN.

The British Medical Journal, March 8 and 15, 1902.

Puerperal Insanity ... ... JONES.

REPORTS OF SOCIETIES.

OBSTETRICAL SOCIETY OF LONDON.

Wednesday, March 5, 1902, PETER HORROCKS, M.D., *President, in the Chair.*

Dr. R. G. MCKERRON read a paper on **Suppression of Urine after Labour.***

Dr. BOXALL presented the details of two cases in which partial suppression of urine occurred, in one after labour, and in the other after a five-months' miscarriage. In both cases the patient died, and in both disease of the kidneys had previously occurred. Except for persistent vomiting, there were no marked symptoms indicative of the grave condition of the kidneys till shortly before death. In the first case the urine was examined soon after labour, and active measures, which included saline injections into the bowel and into the veins, were early adopted, but unfortunately failed to re-establish the functions of the kidneys.

Dr. GRIFFITH said that there appeared to be two classes of puerperal cases of suppression of urine, one the common class of acute nephritis, with or without eclampsia; the other, very rare, and quite unconnected with this disease. He had seen one of the latter some years ago at Blackheath—a primipara, without headache or uræmic symptoms, and with complete suppression of urine, who survived about five days, and the treatment adopted failed completely. His recollection of the case was that it was a complication of acute septicæmia.

Dr. W. MURRAY LESLIE said he could recall three cases, where, however, the anuria did not prove complete, though the daily amount of urine voided was in excessively small quantities, and loaded with albumen, and in each of these cases the main factor in setting up the condition proved to be alcohol.

Dr. TATE referred to a very remarkable case reported by Bradford and Lawrence in the *Journal of Pathology and Bacteriology*, May, 1898. The patient, a multipara, was delivered of a still-born child on February 28, 1896. She said she passed no urine from the time of her confinement until March 2, when two teaspoonfuls were drawn off. There were no fits or twitchings; the patient gradually got worse, and died suddenly on March 7. At the post-mortem there was found widespread endarteritis of the interlobular arteries, which were thrombosed, and had caused necrosis of the convoluted tubules throughout the cortex of the kidney.

The PRESIDENT showed two **sarcomata of the ovary**, each tumour being the size of a football. They were removed recently from two patients, who presented almost identical symptoms—namely, a large, reely movable solid tumour, together with abundant ascites (necessitating

* *Vide* p. 369.

paracentesis in one case to relieve dyspnœa), marked wasting, pyrexia, and pleurisy. The latter was thought to be possibly due to secondary growths. Both patients were making a good recovery. It was interesting to note that in one case the small intestines were so intimately adherent as to require a very careful dissection, whilst in the other case there were no adhesions. Now, in the former the sarcomatous elements were most abundant, whilst in the latter the fibrous element predominated. Both women were multiparous. The one with the marked sarcoma was under thirty, and the other about forty years of age.

Uterine Fibromyoma.—Dr. Victor Bonney showed two specimens from a patient, aged fifty, who had suffered for twelve years from an abdominal tumour of large size. Last October she was seized with symptoms of subacute intestinal obstruction, and subsequently spontaneously passed an intussusception of the large intestine about 6 inches in length, with immediate relief to the symptoms. The patient lived nearly five months after this event, but finally symptoms of obstruction again appeared, and she died. The abdominal tumour was found on autopsy to consist of a large myomatous uterus and a large, solid tumour of the left ovary, to the surface of which was attached what was probably a tubo-ovarian cyst of unusual size. The interest of the solid ovarian tumour centred around the relation between it and the attached cyst, since inspection failed to decide whether the cyst was a very large hydrosalpinx or formed an integral part of the tumour.

Rupture of an Ovarian Abscess.—Dr. Comyns Berkeley showed a uterus and appendages removed from a patient who had died twelve hours after the termination of labour from acute peritonitis caused by rupture of an ovarian abscess. The patient, a multipara, had never suffered from any illness except an attack of pelvic inflammation, which occurred before her marriage ten years ago. The pregnancy had been uneventful. Intermittent pains commenced on January 5. On January 7 the pain became continuous and distressing, and patient began to vomit yellow fluid. Later in the day the labour terminated naturally, but she became rapidly worse and much collapsed, death occurring at the end of twelve hours. At the post-mortem purulent peritonitis was found to be present, with a large amount of semi-purulent fluid in the abdomen. The right ovary and both tubes were healthy, but the left ovary formed an abscess sac, which was bound down to the posterior surface of the uterus by old adhesions. There was an opening at the lower part of the abscess, through which pus was escaping. The abscess had also burst into the broad ligament, and pus was escaping from an opening in that structure.

BRITISH GYNÆCOLOGICAL SOCIETY.

Thursday, March 13, Dr. J. Halliday Croom, *President, in the Chair.*

Specimens.—Mr. Furneaux Jordan showed a dermoid cyst which had prevented delivery, and which he had removed after a Cæsarean section—too late to save the child, but successfully as regards the mother

—and also a uterus with myomata of both broad ligaments; Mr. O'Callaghan some myomata, one with hepatic adhesions; and Mr. Spanton a single interstitial myoma, 8 pounds in weight, obliterating the uterine cavity.

The discussion of these specimens, in which the President, Dr. Macnaughton-Jones, Dr. Mansell-Moullin, Dr. Snow, Dr. Travers, and Mr. Ryall took part, turned upon the great tendency of single myomata to be malignant, and upon the extreme importance of the pulse in indicating danger after abdominal operations. Dr. Macnaughton-Jones deprecated too much importance being given to any one symptom—*e.g.*, the pulse, especially in neurotic patients, might be very misleading; he showed a chart of a case of hysterectomy which recovered without any complications, though the pulse ran up to 190 within about seven days after the operation.

Mr. Freyer (as guest) showed a myoma he believed to be the largest intravesical tumour on record, removed by a suprapubic incision; it weighed 9 ounces, and had in labour impeded delivery till successfully pushed out of the way.

Suppuration of the Ovary.—The President, in a communication on this subject, said that it was almost invariably due to infective salpingitis, and was favoured by the presence of a corpus luteum, or cyst. An exceptional case upon which he had lately operated successfully, showed no intimate connection between the tube and ovary, but a small amount of pus outside the crenated edges of a corpus luteum had led to such persistent pyrexia as was remarkable in view of the absence of fever in connection with much larger foci in other parts of the body, notably in many cases of pyosalpinx and pyometra. The patient did well, though for twenty-four hours she had hæmatemesis, with a quickened pulse, but no pyrexia. He looked upon hæmatemesis as one of the most serious complications of abdominal work, and in his experience it had been almost always the precursor of death, and so closely associated with infection that, though its cause was in no way revealed by post-mortem lesions, he was disposed to attribute it to sepsis rather than to anæsthetic vomiting, handling of the stomach and intestines, thrombosis of the omental vessels after injury or ligature and consequent embolism in the walls of the stomach, or any other cause that had been suggested. It was not confined to abdominal operations, and in connection with general surgery had been very ably discussed by Robert Purves, who found it associated with a mortality of 72 per cent. Age was no factor in its occurrence.

Stone in the Female Bladder.—Mr. Freyer, in a paper on this subject, drew attention to the ease and success with which litholapaxy could be performed in the female, even in very young children, or in the later months of pregnancy; the only special difficulty—escape along the side of the instrument of the indispensable fluid from the bladder—was easily prevented by the pressure of the fore and middle fingers of an assistant's hand on the posterior lip of the urethra. Women got over the operation in a day or two, and no incontinence was left. He had had most satisfactory results in seven children and fifteen adults. One uric

acid calculus, 2 ounces in weight, in a woman of seventy, he could not crush, and removed by vaginal lithotomy, but he would now prefer the suprapubic incision. Before adopting litholapaxy, he had removed stones from three children through the urethra, but incontinence was left in one.

Mr. SPANTON showed stones of 70 grains and 180 grains removed through the urethra of very young children, and a slate pencil, 2·5 inches long, from the bladder of a girl of eleven. There was no incontinence in any of these cases. He concurred with Mr. Freyer that litholapaxy, or, in the case of very large stones, suprapubic lithotomy, was the treatment to be adopted.

EDINBURGH OBSTETRICAL SOCIETY.

Wednesday, March 12, DR. JAMES RITCHIE, *President, in the Chair.*

The Problem of the Premature Infant.—Dr. J. W. BALLANTYNE read a paper on this subject. He pointed out that in the 'premature infant' there was defective adjustment of capabilities to environmental requirements, and the dangers to the infant were due to the absence of the transition time, which the full-time infant enjoyed. He described in some detail the differences between the anatomy of the premature child and the fully-developed one. As regarded the physiology of the premature child, he pointed out the loss it suffered by missing the physiological experiences of the last trimester of intra-uterine life. The premature infant was more liable to pathological conditions. In conclusion, Dr. Ballantyne discussed the management of the premature infant, and said an attempt should be made to attain a perfect adjustment of inefficient capabilities to exacting requirements. One should try to prolong the fœtal phase of life after birth.

Dr. MILNE MURRAY, in the course of his remarks upon the paper, said they must keep in mind that, while in certain premature infants the physical conditions might be unsatisfactory, yet the mental qualifications were sometimes provided for in a very high degree. Sir Isaac Newton was a premature infant. In France and in America there was a tendency to despise the premature infant and to prefer delivery at term by Cæsarean section or symphysiotomy. But until some other reasons were given they must always consider the feasibility of the induction of premature labour under certain conditions. As regarded the management of the infant, he had for ten years abandoned all forms of mixtures, and had used only pure sterilized milk in small quantities, with the best results. They must give the premature infant a certain credit for adapting itself to circumstances.

Dr. KEPPIE PATERSON advocated the establishment of a central institute for the management of premature infants.

Dr. MCVIE thought the essentials of the treatment of premature infants were constant heat, constant supply of nourishment, and to have the infant kept in the dark.

The PRESIDENT pointed out that the age of the child was no absolute criterion of its strength, and many born at the full time were premature as far as strength was concerned. He attached most importance to the

maintenance of heat. He did not agree with Dr. McVie that constant feeding was necessary; he believed the stomach required rest, and that feeding every hour and a half was quite sufficient.

Further Notes on the Use of Thyroid Extract in Puerperal Eclampsia and the Pre-Eclamptic State.—Dr. Oliphant Nicholson read a paper on this subject.

Firstly, he recorded a case of eclampsia in a primipara at the beginning of the eighth month. The treatment was by one dose of morphia after the first fit, and subsequently by thyroid extract. The patient recovered, and all the symptoms disappeared.

Secondly, he read further notes on the first case of eclampsia, treated by thyroid extract, reported in *Transactions of the Edinburgh Obstetrical Society*, vol. xxvi. This patient had reached the eighth month of another pregnancy, and from its commencement had taken thyroid extract continuously. There had been no eclamptic symptoms.

Thirdly, he gave a brief account of a case of a primipara, aged twenty-three, who in the seventh month had typical pre-eclamptic symptoms. She was put on thyroid extract, and all the symptoms disappeared. The child, however, was born dead.

Lastly, he read notes of a case of puerperal albuminuria which was cured by the administration of thyroid extract.

Dr. Haultain thought it a great misfortune that the child in the third case was born dead, otherwise Dr. Nicholson would have established a very good point in favour of thyroid treatment; but they knew that after the death of the fœtus there was a tendency for the albuminuria and other symptoms to disappear. It appeared to him that from the point of view of being a dilator of the bloodvessels, thyroid extract would probably act efficiently in many instances in allowing the elimination of the poison through the skin and eventually through the kidneys also. In eclampsia the organs primarily affected were not the kidneys; the lesion was elsewhere, probably in the liver. He felt that at present it was only shown that thyroid extract acted as a vaso-dilator, and therefore tended to obviate the spasms associated with eclampsia.

Dr. Milne Murray did not think it was proved that the liver was more connected with eclampsia than any other organ. He related the case of a patient who had every pre-eclamptic symptom in a marked degree but no fit during or after labour. She had a very large goitre. He pointed out some of the dangers in the use of the thyroid extract.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Wednesday, January 22, 1902, Dr. W. J. Smyly, *Dublin, Hon. President, in the Chair.*

Dr. Smyly delivered an address, taking for his subject the **Treatment of Endometritis.** He defined the conditions included under endometritis, and gave his reasons for preferring the old arrangement of

interstitial and glandular disease, and not myxoma and adenoma. In discussing the etiology he classified the cases into (*a*) those in which micro-organisms are always present—*e.g.*, septic, gonorrhœal, etc.; (*b*) those in which germs do not exist—*e.g.*, interstitial, glandular, fungous, etc. As regarded treatment, he said that prevention was better than cure, and, therefore, the prevention of those diseases causing endometritis required the utmost care. There remained, however, a large number of cases which required local remedies. Leucorrhœa in young unmarried women rarely needed local treatment, as it generally depended on constitutional causes. In septic endometritis, although some had abandoned local measures as useless, he regarded even partial removal of infectious matter as of vast importance. Antiseptic douching with several pints of the less dangerous antiseptics, such as lysol, should be commenced at the earliest possible moment, and later, if indicated, the uterine cavity plugged with iodoform gauze, renewed every twelve hours. He condemned the sharp curette as dangerous, but considered that a blunt instrument, such as Rheinstädter's flushing-curette, was often of great value in removing putrid material which could not be dislodged by the finger. The last resource, rarely justifiable, was total hysterectomy.

In the treatment of chronic endometritis the methods in vogue were: (1) antiseptic and astringent douches, (2) the curette, (3) chemical caustics, (4) the thermo- and electro-cauteries, (5) steam, and (6) hysterectomy. Out of all these he gave the curette first place, although of late its merits had been unduly disparaged. If suitably and skilfully employed, it was efficient, simple, and safe, and it was our only means of arriving at an exact diagnosis. It was specially useful in cases where hæmorrhage was the chief symptom—*e.g.*, post-puerperal and fungous endometritis; was seldom of use in those chiefly characterized by leucorrhœa—*e.g.*, interstitial endometritis; and very uncertain in the cure of pain—*e.g.*, dysmenorrhœa. A case was then cited showing the dangers of its unskilful use, especially in early abortion, the finger being the proper and only safe method of dealing with retained portions of the ovum.

He considered carbolic acid in alcohol the best of the various caustics employed. Nitric acid was too powerful and unmanageable, and the fact that in some cases it caused obliteration of the uterine cavity, or left cicatricial tissue, had prevented him using it any more. Chloride of zinc was strongly recommended by Sänger, but, although efficient, its imperfections were many. He had lately used 30 per cent. formalin, and so far with very good results. The safest method for applying caustics was by cotton wrapped on probes, and rendered thoroughly aseptic. Before application the cervical canal should be antiseptically cleansed. The probes were passed again in about a fortnight.

The dangers of the intra-uterine syringe for injecting caustics, and the experiments proving them, were next referred to. Finally the application of steam—atmo-causis and zesto-causis—as a method of treatment was fully described, and the objections to it stated.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting, Friday, February 21, 1902, DR. S. BUCKLEY, *President, in the Chair.*

Solid Carcinomatous Tumours of the Ovary.—Dr. H. BRIGGS (Liverpool) showed specimens from three cases, and said that it appeared to be correct to regard solid ovarian tumours as very rarely carcinomatous. In two of the cases described the disease was unilateral, and in both adeno-carcinoma. One of the patients, aged thirty-six, operated on in October, 1900, was still well. The other, aged fifty-three, died from recurrence of the disease in the abdomen four months after operation. In the third case, that of a patient aged thirty-two, the disease was bilateral; each tumour was solid, hard, and lobulated, somewhat resembling a fibroma. The sections proved it to be scirrhus carcinoma, such as is usually noticed when the ovarian growth is secondary to carcinoma of the breast. There was no evidence, however, of primary growth in any other part than the ovary. The patient died of widely distributed recurrence of the disease four months after removal of the ovarian tumours.

Dr. A. DONALD considered that among the solid ovarian tumours primary carcinoma was very rare, most cases of carcinoma in this situation being secondary to disease in the breast or elsewhere. He thought that the most common form of actually solid tumour was a fibroma.

Dr. NATHAN RAW thought that pure fibroma of the ovary was extremely rare, and that it is highly probable that most of those described were really fibromyomata.

Dr. ARTHUR HELME mentioned the extreme difficulty of recognising involuntary muscle fibre when present with fibrous tissue, and said that it was unwise to venture a positive opinion from the examination of ordinary sections. He emphasized the importance of teasing out the fibres in fresh specimens of tissue.

Carcinoma of the Cervix Uteri, with Double Pyosalpinx in a Nullipara, aged Twenty-three, removed per Vaginam, by T. ARTHUR HELME, M.D. (Manchester).—The patient, from whom the uterus and tubes shown were removed, was a young woman aged twenty-three, who had been married about twelve months, but had never been pregnant. Menstruation had been normal until some six months before operation, when it became more frequent and prolonged, and during the last three months there had been irregular intermenstrual discharges. The husband had suffered from gonorrhœa, and probably syphilis, about a year before marriage, and it is possible that this was conveyed to the wife, and acted as a local source of irritation; this goes to support the common supposition that gonorrhœa previously acquired predisposes to cancer of the uterus. The points of interest were—the extreme rarity of cancer of the cervix under twenty-five years, and its occurrence in a nullipara. The growth was cylinder-celled carcinoma attacking the anterior lip of the cervix.

Solid Ovarian Tumour and Primary (?) Tubercular Peritonitis with Ascites—Abdominal Section, by T. Arthur Helme, M.D. (Manchester).—The patient, who was thirty-one years old, had been failing in health for several months. Indigestion, wasting, and gradual enlargement of the abdomen were the chief symptoms. There was also an evening rise of temperature with a fall to subnormal in the morning. The physical signs were those of a solid, hard, movable, rounded tumour in the right ovarian region, together with a considerable amount of free fluid in the peritoneal cavity. The uterus was small. The tumour proved to be a solid fibromatous growth of the right ovary, with no evidence of malignancy on subsequent microscopic examination. The tube was left intact, as it appeared healthy, as also were the left ovary and tube, which were not removed. It was then found that the whole of the posterior surface of the right broad ligament and uterus were covered with a thick yellowish, caseous, tuberculous-looking material, and other parts of the pelvic peritoneum showed the usual appearances of tubercular peritonitis. The ascitic fluid was drained off and the abdomen closed. The patient made an excellent recovery, and had since gained weight. It was now nine months since the operation. The chief interest of the case was the association of the two conditions—the presence of a solid ovarian tumour and the apparently primary tubercle of the peritoneum.

Solid Tumour of the Ovary, by W. Walter, M.D. (Manchester).—The growth, the size of a small cocoanut, was in the right ovary. There was no ascites. The uterus and the other ovary were small and healthy. The greater portion of the tumour resembled a fibroma, but at one part the capsule was soft and friable, and under this spot the interior of the tumour was pink-red in colour, and of the consistence of putty. A few small blood extravasations were found in the centre. There was no evidence of myxomatous degeneration. Microscopical sections from various parts showed the ovarian stroma infiltrated with a mass of round-celled sarcoma.

Dr. Walter, in reply to Dr. Briggs and Dr. Donald, admitted that the healthy condition of the left ovary and the absence of ascites were both points in favour of the tumour being a fibroma; but he did not consider these essential points, for fibromata might be found in both ovaries, and hydroperitoneum was occasionally met with in fibroma of the uterus as well as of the ovary. Carcinoma and sarcoma of the ovaries were frequently bilateral, but not invariably so. The appearance of the tumour at the time of operation led him to believe it was sarcomatous, and the microscopical section, in his opinion, confirmed the diagnosis. The future history of the patient would be reported to the Society.

REVIEWS OF RECENT BOOKS.

LEÇONS DE CLINIQUE OBSTÉTRICALE. By Dr. Queirel, Professeur de Clinique Obstétricale à l'École de Médecine de Marseille. Paris: Steinheil, 1902.

This volume of twenty-five clinical lectures on obstetric subjects is of great practical interest, and will be read with profit both by teachers and practitioners. The subjects reviewed are various, including four lectures on puerperal infection, one on obstetric antisepsis, two on extra-uterine pregnancy, one on pelvic hæmatocele, basiotripsy, indications for the application of forceps, tuberculosis and pregnancy, purpura, cephal-hæmatoma, etc. The author claims that his purpose is not to display erudition, but faithfully and sincerely to record the clinical facts which he has observed in his work. This is, of course, the true attitude of mind of the clinical observer, which, to quote the author, should ever be '*l'amour de la recherche de la vérité*.'

As examples of Dr. Queirel's teaching we will take the lectures upon 'Indications for the Application of Forceps' and 'Tuberculosis and Pregnancy.' He points out that there are two classes of cases in which the practitioner will be often urged to terminate labour with forceps: firstly, in cases where inertia supervenes, when the head reaches the pelvic floor, and, secondly, when the termination of the second stage is delayed by abnormal resistance of the soft parts. In cases of inertia the life of the fœtus is not imperilled, nor is there any danger of injurious pressure upon the maternal soft parts; on the other hand, forceps extraction must never be regarded with indifference, for it may be the cause of injury both to mother and child. 'Do not allow yourselves,' says Dr. Queirel, 'to imitate the practice of the old English school—interventionist in the highest degree—presuming by a hasty forceps extraction to succour the woman from the exhaustion of prolonged labour, and even from puerperal infection.' He counsels patience in these circumstances as the true remedy. In the second case, on the other hand, real dangers beset both mother and child, and intervention may without hesitation be undertaken. The author is especially emphatic with regard to the dangers of applying forceps before the cervix is fully dilated. This, he says, is 'a truly criminal act, for it may cause death.' Further, he discountenances all high-forceps applications to the head when not engaged in the pelvic brim; under such circumstances he advises symphysiotomy, for if the head does not engage when the cervix is fully dilated, some contraction of the pelvis must be present.

In the lecture on 'Tuberculosis and Pregnancy,' Dr. Queirel gives evidence of possessing some of that erudition which he so modestly disclaims in his preface. This lecture contains an admirable epitome of recent observations upon the passage of micro-organisms through the placenta, and its relations to inherited disease. He expresses himself strongly in favour of inducing abortion in all cases where there is definite

pulmonary tubercular disease, adopting the classic view that the child of a tubercular mother is condemned from the moment of its birth, and that a tubercular woman's chance of cure is seriously compromised by pregnancy. He endeavours to find support for this view in the writings of Pinard, but the latter, in a preface to this volume of lectures, energetically disclaims all sympathy with this view, and declares that the complication of tubercular disease and pregnancy is never an indication for inducing abortion.

Many other lectures in this series are of equal interest with those just quoted, that dealing with 'Intestinal Obstruction and Pregnancy' being especially valuable, for few observers have had much experience of this serious complication.

MANUAL OF ANTENATAL PATHOLOGY AND HYGIENE: THE FŒTUS. By J. W. Ballantyne, M.D., F.R.C.P.E., F.R.S. (Edin.); Lecturer on Midwifery and Gynæcology, Medical College for Women, Edinburgh; Lecturer on Antenatal Pathology and Teratology in the University of Edinburgh (1900), etc. Edinburgh: William Green and Sons, 1902.

The author of this fine volume is well known as an indefatigable worker in the dark field of intra-uterine physiology and pathology. He stands alone in respect to the amount of work he has accomplished and the nature of the opportunities that have come in his way of making acquaintance at first-hand with the subject which is peculiarly his own. No living man of any nationality is better qualified than Dr. Ballantyne to speak with authority upon this subject. Reputations are sometimes made by books; our author, having made his reputation, can launch his book with a momentum that should carry it round the world.

It is difficult, within the limits of a notice that aims at being read, to give anything like an adequate impression of these 500 pages of solid information. In the preface the author explains that the present volume is only Section I. of the manual he proposes to write; teratology and morbid heredity will be treated in Section II. The present volume opens with a discussion of the relations of antenatal problems to other branches of medical science and to neonatal diseases; passes thence to an account of the anatomy and physiology of the mature fœtus; thence to a consideration of transmitted and idiopathic fœtal diseases; the final chapters dealing with the diagnosis and therapeutics of fœtal morbid states. Fourteen coloured plates and fifty-four illustrations in the text elucidate the multitudinous subjects of consideration.

Two things especially strike us in reading Dr. Ballantyne's pages: firstly, the number and variety of the original contributions he has himself made to the subject, and, secondly, the wide range of his reading. The author has had what he himself calls the 'extraordinary fortune' to personally examine and study 300 specimens, embracing almost all the leading types of antenatal conditions; this experience is probably unique. That he has not neglected his opportunities is evident from the fact that he is able to show in an appendix that between the years 1883 and 1901 his

own personal contributions to the subject reach the astounding total of 228. He has quoted in this work nearly 1,000 other authors besides himself, a fact which shows that it may truly be regarded as a repository of all that is known and has been written upon the subject in practically every civilized tongue.

To an average reader this book is a mine of information. The section dealing with the physiology of the fœtus is of especial interest from the new light in which such subjects as cardiac action, blood, temperature, and nutrition are presented and developed. As the author remarks, the 'most difficult problem in fœtal physiology is the nutrition of the unborn infant.' With regard to this problem, many facts in connection with the temperature and the chemistry of the excretions of the fœtus are adduced to indicate that probably an important and hitherto almost unsuspected part is played by the fœtus itself in the building up of its own tissues. With regard to fœtal excretion, the author has many interesting facts to set forth, not only as to the excretions proper (meconium, urine, etc.), but also as to the substances which can pass the placenta from the fœtus to the mother. The recent work of French observers—*e.g.*, Charrin, Lannois, and Briau—in this direction receives full recognition at Dr. Ballantyne's hands. Concerning the physiology of the ductless glands (thyroid, thymus, and adrenals), the author has also much to say of great interest and suggestiveness.

The morbid states of the fœtus are described under several sections: transmitted diseases, transmitted toxicological states, idiopathic diseases, neoplasms, traumatic morbid states, diseases of the fœtal annexa, and the pathology of fœtal death. Of the transmitted diseases, fœtal tubercle and syphilis are discussed with the greatest care and thoroughness. The mode of transmission of syphilis is handled with elaboration and forethought, and is separately considered as regards the three great subdivisions of antenatal life—viz., the germinal period, the embryonal period, and the fœtal period. Upon the vexed question of the occurrence of 'conceptional syphilis' the author does not dogmatize, but expresses the view that 'its mechanism is outside ordinary physiological laws of transmission.' The short section on fœtal alcoholism contains some data of great interest bearing upon the fœtal and infant mortality of chronic women drunkards. The author also inclines to the view that the children of drunken parents are prone to epilepsy and imbecility, but seems to doubt whether malformation can ever be so explained. Interesting illustrations are given of fœtal small-pox, dropsy, elephantiasis, ichthyosis, pemphigus, etc. Fœtal bone diseases are described in five types (A to E), and the opinion is expressed that the true system of classification will ultimately be found to be that which refers each type to the period of antenatal life in which it originated. Type A is that usually described as fœtal rickets, but the author is evidently unable to accept the evidence of its relation to that condition as conclusive.

Finally, a word of praise is due to the publishers, who have produced a handsomely-bound and well-executed volume, similar, as we believe, in form to their 'Encyclopædia Medica.'